

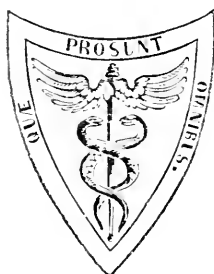
THE
AMERICAN JOURNAL
OF THE
MEDICAL SCIENCES.

EDITED BY
ISAAC HAYS, M.D.,

FELLOW OF THE PHILADELPHIA COLLEGE OF PHYSICIANS; PRESIDENT OF
THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA; MEMBER OF THE AMERICAN
PHILOSOPHICAL SOCIETY; ASSOCIATE FELLOW OF THE AMERICAN
ACADEMY OF ARTS AND SCIENCES,
&c. &c. &c.

NEW SERIES.

VOL. LIII.



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TO READERS AND CORRESPONDENTS.

Communications are on hand from Drs. S. W. Gross, J. H. Salisbury, J. P. Mettauer, S. J. Radcliffe, Benjamin Lee, John Hart, Ephraim Cutter, P. Wales, B. J. Day, H. C. Mathis, G. W. H. Kemper, A. H. Daniels, Wm. T. Taylor, Charles D. Pearson, H. B. Passage, Alonzo Calkins, A. Godfrey, W. Brooks, J. M. Snyder, J. R. Weist, Ad. Stenhoff, Charles C. Shoyer, B. Hesse, John O'Reilly, and C. H. Ohr, all of which shall receive respectful consideration when papers are selected for the next No.

A number of papers on Cholera have been received, which, as they do not add anything positive to our knowledge of that disease, we must decline publishing.

Want of space has compelled us to omit a portion of the Proceedings of the Pathological Society of Philadelphia; they will be continued in our next number.

All articles intended for the *Original Department* of this Journal must be communicated to it *exclusively*.

Contributors who design to favour us with original articles for the next No. should forward them before the 1st of February.

Compensation is allowed for original articles and reviews, *except* when illustrations or extra copies are desired. A *limited* number of extra copies will be furnished, if the request for them be made *when the communication is sent*. The extensive circulation of this journal renders extra copies comparatively of little value to authors, who only desire their observations made known to their professional brethren.

In the notice in our last No. of the very interesting case of successful ligation of the external iliac artery with silver wire (p. 580), the name of the operator was erroneously printed C. H. Martin, instead of C. H. MASTIN, of Mobile.

The following works have been received:—

Guy's Hospital Reports. Edited by C. HILTON FAGGE, M.D., and ARTHUR E. DURHAM. Third Series, Vol. XII. London: John Churchill & Sons, 1866.

Saint Bartholomew's Hospital Reports. Edited by Dr. EDWARDS and Mr. CALLENDER. Vol. II. London: Longmans, Green & Co. 1866.

Clinical Lectures and Reports, by the Medical and Surgical Staff of the London Hospital. With an Appendix on the Recent Epidemic of Cholera. Vol. III. London: John Churchill & Sons, 1866.

A Practical Treatise on Apoplexy (Cerebral Hemorrhage); its Pathology, Diagnosis, Therapeutics, and Prophylaxis; with an Essay on (so-called) Nervous Apoplexy, on Congestion of the Brain, and Serous Effusion. By WILLIAM BOYD MCHET, M. B. Lond.; M. R. C. P. L., etc. London: John Churchill & Sons, 1866.

The Antidotal Treatment of the Epidemic Cholera; with Directions, General and Individual, for the Prevention of the Disease. By JOHN PARKIN, M.D., F. R. C. S., late Medical Inspector for Cholera in the West Indies. Third Edition. London: John Churchill & Sons, 1866.

Acholic Diseases; comprising Jaundice, Diarrhœa, Dysentery, and Cholera. With a Preliminary Dissertation on Bile, the Biliary Function, and the action of Cholagogues. By ALEXANDER CHARLES MACLEOD, Surgeon-Major of her Majesty's Madras Establishment, etc. London: John Churchill & Sons, 1866.

A Treatise on Emotional Disorders of the Sympathetic System of Nerves. By WILLIAM MURRAY, M.D., M. R. C. P. Lond., Physician to the Dispensary and to the Hospital for Sick Children. London: John Churchill & Sons, 1866.

Cancer: a New Method of Treatment. By W. H. BROADBENT, M. D., Lond., As't Phy. to St. Mary's Hospital, etc. London: John Churchill & Sons, 1866.

On the Treatment of Pulmonary Consumption by Hygiene, Climate, and Medicine. By J. HENRY BENNET, M. D., M. R. C. P., etc. etc. etc. London: John Churchill & Sons, 1866.

Temperature in Acute Disease; being a Thesis read for the degree of Doctor in Medicine before the University of Dublin, June 26, 1866. By THOMAS ARNETRIDDING COMPTON, M. D., B. A., etc. etc. London: John Churchill & Sons, 1866.

A Practical and Theoretical Treatise on the Diseases of the Skin. By GEORGE NAYLER, F. R. C. S., Assistant-Surgeon to the Hospital for Diseases of the Skin, Bridge Street, Blackfriars. London: John Churchill & Sons, 1866.

Club-Foot: Its Causes, Pathology, and Treatment. Being the Essay to which the Jacksonian Prize for 1864, given by the Royal College of Surgeons, was awarded. By WILLIAM ADAMS, F. R. C. S., Surgeon to the Royal Orthopædic and Great Northern Hospitals, etc. etc. etc. With one hundred illustrations on wood and stone. London: John Churchill & Sons, 1866.

Cholera: its Seat, Nature, and Treatment. By CHARLES SHRIMPTON, M. D., Chevalier de la Legion d'Honneur, etc. London: John Churchill & Sons, 1866.

Clinical Histories with Comments. By HENRY DAY, M. D., M. R. C. P., Physician to the Stafford County Infirmary. London: John Churchill & Sons, 1866.

Animal Magnetism and Magnetic Lucid Somnambulism, with Observations and Illustrative Instances of Analogous Phenomena occurring spontaneously; and an Appendix of Corroborative and Correlative Observations and Facts. By EDWIN LEE, M. D., etc. etc. etc. London: Longmans, Green & Co., 1866.

On Abscess and Tumours of the Orbit. Part I. By SPENCER WATSON, F. R. C. S. Eng., Asst. Surg. King's College and the Central London Ophthalmic Hospitals. London: H. K. Lewis, 1866.

Contribution a l'Histoire des Mariages entre Consanguins par le Dr. AUGUSTE VOISIN, Médecin de l'Hospice de Bicêtre. Paris: J. B. Baillière et Fils, 1866.

Etude Médico-Légale sur le Curare (I). Par M. AUGUSTE VOISIN, Médecin de l'Hospice de Bicêtre, et M. HENRY LIONVILLE, Interne des Hôpitaux de Paris. Paris, 1866.

Congres Médical International de Paris. Statuts et Programme. Paris, 1866.

A Handy-Book of Ophthalmic Surgery for the Use of Practitioners. By JOHN Z. LAURENCE, F. R. C. S., M. B. (Univ. Lond.), Surgeon to the Ophthalmic Hospital, Southwark; and ROBERT C. MOON, House-Surgeon to the Ophthalmic Hospital, Southwark. With numerous Illustrations. Philadelphia: Henry C. Lea, 1866.

A Manual of Medical Jurisprudence. By ALFRED SWAINE TAYLOR, M. D., F. R. S., etc. etc. Sixth American from the eighth and revised London edition. With Notes and References to American Decisions. By CLEMENT B. PENROSE, of the Philadelphia Bar. Philadelphia: Henry C. Lea, 1866.

A Practical Treatise on Diseases of the Skin. By J. MOORE NELIGAN, M. D., M. R. I. A. & C. Fifth American from the second revised and enlarged Dublin edition. By T. W. BELCHER, M. A., M. D. Dub., B. M., M. A. Oxon., etc. etc. etc. Philadelphia: Henry C. Lea, 1866.

An Introduction to Practical Chemistry, including Analysis by JOHN E. BOWMAN, F. C. S. Edited by CHARLES L. BLOXAM, F. C. S. With one hundred and seven Illustrations. Fourth American from fifth revised London edition. Philadelphia: Henry C. Lea, 1866.

Clinical Observations on Functional Nervous Disorders. By C. HANDFIELD JONES, M. B. Cantab., F. R. C. P. Lond. Philadelphia: Henry C. Lea, 1867.

A Treatise on the Principles and Practice of Medicine, designed for the Use of Practitioners and Students of Medicine. By AUSTIN FLINT, M. D., Prof. of Principles and Practice of Medicine in the Bellevue Hospital Medical College, and in the Long Island College Hospital, etc. etc. etc. Second edition, revised and enlarged. Philadelphia: Henry C. Lea, 1867.

A Treatise on the Practice of Medicine. By GEORGE B. WOOD, M. D., LL. D., President of the American Philosophical Society, President of the College of Physicians of Philadelphia, Emeritus Professor of the Theory and Practice of

Medicine in the University of Pennsylvania, etc. etc. etc. Sixth edition. In two volumes. Philadelphia: J. B. Lippincott & Co., 1866. (From the Author.)

Notes on Epidemics, for the Use of the Public. By FRANCIS EDMUND ANSTIE, M. D., F. R. C. P., Senior Assistant Physician to the Westminster Hospital. First American edition. Philadelphia: J. B. Lippincott & Co., 1866.

Infantile Paralysis, and its Attendant Deformities. By CHARLES FAYETTE TAYLOR, M. D., Resident Surgeon Orthopædic Dispensary, etc. etc. etc. Philadelphia: J. B. Lippincott & Co., 1867.

The Science and Practice of Medicine. By WILLIAM AITKIN, M. D. Edin., Professor of Pathology in the Army Medical School, etc. etc. etc. In two volumes. Vol. I. From the fourth London edition, with additions by Meredith Clymer, M. D., late Professor of the Institutes and Practice of Medicine in the University of New York, etc. Philadelphia: Lindsay & Blakiston, 1866.

Medical Therapeutics, considered chiefly with reference to Articles of the Materia Medica. By EDWARD JOHN WARING, F. R. C. S., F. L. S., Surgeon in her Majesty's Indian Army. From the second London edition. Philadelphia: Lindsay & Blakiston, 1866.

A Manual of Auscultation and Percussion. By M. BARTH, and M. HENRI ROGER. Translated from the sixth French edition. Philadelphia: Lindsay & Blakiston, 1866.

An Index of Diseases and their Treatment. By THOMAS HAWKES TANNER, M. D., F. L. S., Member of the Royal College of Physicians, etc. Philadelphia: Lindsay & Blakiston, 1867.

Elements of Medical Chemistry. By B. HOWARD RAND, M. D., Professor of Chemistry in Jefferson Medical College. Philadelphia: T. Ellwood Zell & Co., 1867.

Diagnosis and Prescription Record. Fourth edition. New York: W. Wood & Co., 1866. (From Dr. E. Seguin.)

Surgical Clinic of La Charité. Lessons upon the Diagnosis and Treatment of Surgical Diseases, delivered in the month of August, 1865, by Prof. VELPEAU. Membre de l'Institut et de l'Académie Impériale de Médecine. Collected and edited by A. REGNARD, Interne des Hôpitaux. Reviewed by the Professor. Translated by W. C. B. FIFIELD, M. D. Boston: James Campbell, 1866.

Medical Recollections of the Army of the Potomac. By JONATHAN LETTERMAN, M. D., late Surgeon U. S. A., and Medical Director of the Army of the Potomac. New York: D. Appleton & Co., 1866.

Asiatic Cholera. A Treatise on its Origin, Pathology, Treatment, and Cure. By E. WHITNEY, M. D., and A. B. WHITNEY, A. M., M. D., late Physician and Surgeon to Diseases of Women in the North Western Dispensary, Visiting Physician, etc. New York: N. W. Dodd, 1866.

Reports of Bvt. Brig.-Gen. D. C. McCALLUM, Director and General Manager of the Military Railroads of the United States, and the Provost Marshal-General, in two parts. Appendix to the Report of the Secretary of War accompanying Message of the President to the 39th Congress, 1st Session. Parts 1 and 2. Washington, 1866. (from J. H. Baxter, M. D., Surgeon and Bvt. Col. U. S. V.)

Annual Report of the Surgeon-General United States Army, 1866. (From the Surgeon-General.)

Report of the Secretary of the Navy, with an Appendix, containing Bureau Reports, etc. Washington, Dec. 1866. (From the Chief of Bureau of Medicine and Surgery, U. S. N.)

Cerebro-Spinal Meningitis. By J. S. JEWELL, M. D., Prof. Anat., Chicago Medical College, etc. etc. etc. Chicago, 1866. (From the Author.)

Alcohol as a Dressing for Wounds, with special reference to its employment by M. Nélaton at the Clinical Hospital, Paris, France. Read before the New Haven County Medical Society, April, 1866, by W. LOCKWOOD BRADLEY, M. D., of New Haven, Conn. New Haven: 1866.

Address of D. HUMPHREYS STORER, M. D., President of the Association. Extracted from the Transactions of the American Medical Association. Philadelphia, 1866. (From the Author.)

Report on the Sanitary Relations of the State of Kansas. By C. A. LOGAN, M. D. Lawrence, 1866.

The Brain and Cranial Nerves, showing their Origin, Arrangement, Principal Divisions and Distribution. By THOMAS BULWER, Undergraduate in Medicine Toronto University. Montreal, 1866. (From the Author.)

Report to the Trustees of the Cleveland City Water Works, of the Analysis of the City Water. By J. LONG CASSELS, M. D., Prof. of Chemistry in Cleveland Medical College. Cleveland, 1866. (From the Author.)

Physiology the True Basis of Rational Medicine. An Introductory Lecture delivered at the University of Maryland, October. 17, 1866. By F. DONALDSON, M. D., Professor of Physiology, Hygiene, and General Pathology. Published by the Class. Baltimore, 1866.

A Treatise on Vesico-Vaginal Fistula. By M. SCHUPPERT, M. D., Surgeon of the Orthopædic Institute at New Orleans, Louisiana, United States of America. New Orleans, 1866. (From the Author.)

Neuralgia of the Face. "Tic Douloureux." Resection of the Fifth Pair of Nerves in the Spheno-Maxillary Fossa at the Foramen Rotundum of the Sphenoid Bone. Cure. By M. SCHUPPERT, M. D., Surgeon of the Orthopædic Institute, New Orleans, La. (From the Author.)

Paralysis from Peripheral Irritation. By S. WEIR MITCHELL, M. D., Member of the National Academy of Sciences, etc. etc. etc. New York, 1866. (From the Author.)

On Provision for the Insane Poor of the State of New York, and the adaptation of the "Asylum and Cottage Plan" to their wants: as illustrated by the History of the Colony of Fitz James, at Clermont, France. By CHARLES A. LEE, M. D. Albany, 1866. (From the Author.)

Inhalations in the Treatment of Diseases of the Respiratory Passages, particularly as effected by the Use of Atomized Fluids. By J. M. DA COSTA, M. D., Physician to the Pennsylvania Hospital, etc. New York, 1866. (From the Author.)

Transactions of the Twenty-first Annual Meeting of the Ohio State Medical Society, held at Ohio White Sulphur Springs, July 19, 20, and 21, 1866. Cincinnati, 1866.

Transactions of the Medical Society of the State of Pennsylvania at its 17th Annual Session, held at Wilkesbarre, June, 1866. Philadelphia, 1866.

Proceedings of the Academy of Natural Sciences of Philadelphia, June, July, August, 1866.

Fifteenth Annual Report of the New York Asylum for Idiots. Transmitted to the Legislature March 9, 1866. Albany, 1866.

Eleventh Annual Report of the Births, Marriages, and Deaths in the city of Providence for the year 1865. By EDWIN M. SNOW, M. D., Superintendent of Health and City Registrar. Providence, 1866. (From the Author.)


Eleventh Annual Report of the Trustees of the State Lunatic Hospital at Northampton, October, 1866. Boston, 1867.

Want of space compels us to omit our usual list of Journals received in exchange.

Communications intended for publication, and Books for Review, should be sent *free of expense*, directed to ISAAC HAYS, M. D., Editor of the American Journal of the Medical Sciences, care of Mr. Henry C. Lea, Philadelphia. Parcels directed as above, and (carriage paid) under cover, to Messrs. Trübner & Co., Booksellers, No. 60 Paternoster Row, London, E. C.; or M. Hector Bossange, Lib. quai Voltaire, No. 11, Paris, will reach us safely and without delay. We particularly request the attention of our foreign correspondents to the above, as we are often subjected to unnecessary expense for postage and carriage.

Private communications to the Editor may be addressed to his residence, 1525 Locust Street, Philadelphia.

ALL REMITTANCES OF MONEY, and letters on the *business* of the Journal, should be addressed *exclusively* to the publisher, Mr. Henry C. Lea.

 The advertisement-sheet belongs to the business department of the Journal, and all communications for it should be made to the publisher.

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 2. On the Safe Abolition of Pain in Labour and Surgical Operations by Anæsthesia with Mixed Vapours. By Robert Ellis, Surgeon-Accoucheur. London, 1866. pp. 80.
 3. On Stimulants and Narcotics; with Special Researches on the Action of Alcohol, Ether, and Chloroform on the Vital Organism. By Francis E. Anstie, M.D., M.R.C.P., Assistant Physician to Westminster Hospital, Lecturer on Materia Medica and Therapeutics, etc. London, 1864. pp. 488.
 4. A System of Surgery. Edited by T. Holmes, M.A. Cantab. Vol. III., Art. "Anæsthetics," by Joseph Lister, Esq., Professor of Surgery in the University of Glasgow. London, 1862.
 5. *Traité d'Anesthésie Chirurgicale.* Par Maurice Perrin, Professeur agrégé à l'Ecole impériale de Médecine et de Pharmacie militaires, Lauréat de l'Institut, Chevalier de la Légion d'Honneur, etc. etc. etc., et Ludger Lallemant, Professeur agrégé à l'Ecole impériale de Médecine et de Pharmacie militaires, Lauréat de l'Institut, Chevalier de la Légion d'Honneur, etc. etc. etc. Paris, 1863. 8vo. pp. 668.
 - A Treatise on Surgical Anæsthesia. By Maurice Perrin and Ludger Lallemant.
 6. *Nouveau Dictionnaire de Médecine et de Chirurgie pratiques.* Tome deuxième. Art. "Anesthésiques généraux," par J. Giraldes. Paris, 1865.
 - New Dictionary of Practical Medicine and Surgery. Art. "General Anæsthetics," by J. Giraldes.
 7. *Das Chloroform.* Eine Zusammenstellung der bisher über dasselbe gemachten wichtigsten Erfahrungen und Beobachtungen, vorzüglich in physiologischer und medizinischer Beziehung. Von Dr. Friedrich Sabbarth. Würzburg, 1866. 8vo. pp. 276.
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XV. Transactions of American State Medical Societies:—

1. Transactions of the Twenty-first Annual Meeting of the Ohio State Medical Society, held at Ohio—White Sulphur Springs, July 19, 20, and 21, 1866. 8vo. pp. 173.
2. Transactions of the Medical Society of the State of Pennsylvania, at its Seventeenth Annual Session, held at Wilkesbarre, June, 1866. Fourth Series—Part II. 8vo. pp. 152. 211

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XIX. A Practical Treatise on Fractures and Dislocations. By Frank Hastings Hamilton, A. B., A. M., M. D., Professor of the Principles of Surgery, Military Surgery, and Hygiene, and of Fractures and Dislocations in Bellevue Hospital Medical College; Surgeon to Bellevue Hospital and to the Charity Hospital, New York; Professor of Military Surgery, etc., in the Long Island College Hospital; author of a Treatise on Military Surgery. Third edition, revised and improved, illustrated with two hundred and ninety-four wood-cuts. 8vo. pp. 777. Philadelphia: Henry C. Lea, 1866.	224
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XXVII. On Cancer: its Allies and Counterfeits. By Thomas Weeden Cooke, Surgeon to the Cancer Hospital and to the Royal Free Hospital, late President of the Harveian Society of London, Orator for the year 1866 to the Medical Society of London, etc. etc. 8vo. pp. 226. London: Longmans, Green & Co., 1865.	234
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ART. I.—*Observations on Wounds of the Internal Jugular Vein and their Treatment, with Special Reference to the Safety of the Ligature; embracing a Statistical Account of Eighty-Six Cases, with some Remarks upon the General Applicability of Ligation as a Venous Hemostatic Agent.* By S. W. GROSS, M. D., late Surgeon and Brevet Lt.-Col. U. S. V.

DURING the past summer my attention was directed to the subject of wounds of veins and the arrest of venous hemorrhage by the application of the ligature, a procedure that I have been compelled to adopt in five thigh amputations with uniform success. Extending my investigations, it occurred to me to examine more minutely this much neglected branch of surgical pathology, with its attending and resulting accidents, and to publish, possibly, a series of papers on the injuries of special veins, confining my researches to the large trunks of the neck and extremities. Having collected a large mass of facts as a result of that undertaking, this paper, elucidating some points in the surgical pathology of the internal jugular vein, is now presented to the profession as the first attempt that has been made to classify the not very numerous isolated cases of wounds of that vessel. My aim has been to make an impartial examination of all the cases, and deduce from it the most convenient and successful plan of treatment.

The investigation of any statistical inquiry is always attended with more or less difficulty; the more so in the present case, as I was compelled to gain my information by referring to works not under the head of "wounds of the internal jugular vein;" but under the titles of tumours and wounds of the neck, suicide, ligation of the carotid artery, the introduction of air into veins, and hemorrhage. I have had access to the libraries of the

Pennsylvania Hospital, and of the College of Physicians of Philadelphia, the largest collections of medical works in this country; as well as to the carefully selected surgical library of my father, Dr. S. D. Gross, Professor of Surgery in the Jefferson Medical College, of this city. In most instances I have referred to the original papers, and not depended on second-hand quotations. In all cases the sources of information have been mentioned to enable the reader to refer to the author or journal from which they have been gathered; and as I have carefully consulted the medical periodicals of this and foreign countries, it is probable that few have escaped my notice. Several cases, heretofore unpublished, have also been incorporated in the paper.

It is very remarkable that wounds of the veins and venous hemorrhage, subjects replete with deep interest and of the utmost practical value, have been so little treated of, and have, indeed, been so much slighted. This neglect may have arisen from the fact that fatal instances of wounds of large venous trunks are comparatively seldom recorded, and that authors not having the time to devote to the investigation of these topics, remain content to repeat the very meagre and ill-digested accounts of the writers who have preceded them.

We thus find that Mr. Crisp, in his *Treatise on the Diseases of the Bloodvessels*, to which the Jacksonian Prize for the year 1844 was awarded by the Royal College of Surgeons of England, devotes three hundred and eleven pages to the arterial system, including arteritis, aneurism, and wounds; while his chapter on diseases of the veins occupies but twenty-six pages, of which about the same number of lines are given to the consideration of wounds of the veins. The entire chapter is unworthy a position in his admirable essay.¹

Mr. Hodgson, to whom the Jacksonian Prize for the year 1811 was adjudged, for his *Treatise on the Diseases of Arteries and Veins*, treats of the veins somewhat more fully and satisfactorily than Mr. Crisp. The section on diseases of the veins occupies fifty-six pages, including only inflammation, obstruction, the collateral circulation, and varix. Wounds and hemorrhage are entirely ignored.²

Professor Wilson, in his *Lectures on the Blood and Vascular System*, allots eighteen pages to the anatomy and physiology of the veins, and devotes but fourteen to their diseases, namely: inflammation, suppuration, obliteration, varix, varicocele, and hæmorrhoids. He does not mention wounds, and merely alludes to venous hemorrhage, but fully discusses arterial hemorrhage.³

¹ A Treatise on the Structure, Diseases, and Injuries of the Bloodvessels. Svo. pp. 354. London, 1847.

² A Treatise on the Diseases of Arteries and Veins, containing the Pathology and Treatment of Aneurisms and Wounded Arteries. Svo. pp. 603. London, 1815.

³ Lectures on the Blood and on the Anatomy, Physiology, and Surgical Pathology of the Vascular System of the Human Body. Svo. pp. 429. London, 1819.

Mr. Wise, in his *Essay*, treats of wounds of the veins in one page, advising the application of a temporary ligature when it is required. The chapter on the diseases of the veins is rather more full than that on diseases of the arteries, and is a very great improvement on those of the preceding authors.¹

The statement is very different in regard to wounded arteries and arterial hemorrhage, which have received the attention that their great importance demands. These topics may be found to be fully discussed in all systematic works on surgery, whereas in the very same volumes, injuries of the veins, if alluded to at all, are dismissed in a few paragraphs. In truth the literature of the subject is very meagre; and there are but few papers that can be consulted with any advantage. Of these, by far the most prominent and valuable, although by no means exhaustive, are the essay *On Wounds and Ligatures of the Veins*, by Mr. Benjamin Travers, of London;² the chapter *On the Veins*, by Professor Malgaigne, of Paris;³ *Observations on the Surgical Pathology of the Veins*, by Professor Langenbeck, of Berlin;⁴ and the chapters *On the Surgical Affections of the Veins*, by Professor Weber, of Heidelberg.⁵

The Ligature as a Measure for the Arrest of Venous Hemorrhage.—For the arrest of hemorrhage from wounded veins compression is generally advised as the least dangerous, if not the most convenient measure. In regard to the ligature there is a great diversity of opinion, due in later years, in my judgment, to a misunderstanding of the writings of Mr. Travers. The occurrence of a bad form of phlebitis after ligature, wound, or other mechanical injury is conceded by every one to be very uncommon, and in pointing out this fact as well as the origin of the constitutional disturbance attending it, Mr. Travers has narrated cases which have induced the reader to imagine that the accident is really more frequent than it is. As a result of inquiry and experiment, Mr. Travers has merely shown that the serious consequences sometimes following the puncture of a healthy vein, as in venesection, the operations of tying and dividing diseased veins, as varix of the internal saphenous, the complete or partial ligation of healthy veins, or spontaneous inflammation from an inflamed surface in which the vein lies, were due to extensive inflammation of the internal tunic of these vessels. In support of his views he has detailed four fatal cases from vene-

¹ Essay on the Pathology of the Blood and its Containing Vessels. Second ed. 8vo. pp. 388. Edinburgh, 1858.

² Cooper's and Travers' Surgical Essays. 8vo. Part I. London, 1818.

³ Traité d'Anatomie Chirurgicale et de Chirurgie Expérimentale. Second ed. 8vo., vol. i. chap. x. pp. 306-349. Paris, 1859.

⁴ "Beiträge zur Chirurgischen Pathologie der Venen." Archiv für Klinische Chirurgie. Band i. Berlin, 1860.

⁵ Handbuch der Allgemeinen und Speciellen Chirurgie. Redigirt von Professors von Pitha und Billroth. 8vo. Bände I.-II. Erlangen, 1865.

section, five from ligation of varicose veins, and three from ligation of normal femoral veins. To these predisposing causes he might have added another, namely, the mere exposure of a deep vein during dissection, as in the removal of tumours or the operation for aneurism. From his experiments upon animals he infers that the lining membrane of a vein is susceptible of adhesive inflammation to a very slight extent compared with that of an artery. "Indeed," he remarks of the ligature, "the process of healing and division by ulceration, seem to be conducted without any manifest sign of inflammatory action of the internal tunie;" the obliteration of the vessel being due to interstitial deposits in its coats. Mr. Travers insists on this indisposition of the inner coat to inflame; and that when that process is set up, the inflammation is diffused or continuous. The whole object of his *Essay* is contained in his concluding paragraph, where he says:—

"It is an error to suppose that any quicker sympathy exists between the constitution and venous, than the arterial or absorbent system. I say this because I have observed something like that superstitious alarm, which is excited by events that we do not expect and cannot explain, has been produced by the fatal catalogue of tied veins, and a comparison of this with the generally successful cases of tied arteries. All the mystery of veins is, as I have attempted to show, that they are indisposed to inflame: but when excited, inflame by continuity, and therefore it is that the constitution sympathizes so deeply."

Mr. Travers ascribes the origin of the diffused inflammation to venesection, the ligature or any other local mechanical injury acting upon a *peculiar state of the constitution*. He would, therefore, avoid ligation, as it is not always possible to determine the condition of the blood of a patient upon whom an operation is to be performed. It is thus seen that Mr. Travers has been placed in a false position in regard to the secondary effects produced upon the system by the application of the ligature to a wounded vein. On the second page of his *Essay* he remarks:—

"I have frequently seen the femoral vein tied without any obvious ill effect; and one of the most experienced and successful operators in the west of England lately assured me that he had been in the constant practice of tying the main vein distinctly from the artery in amputations."

The Ligature an Ancient Procedure.—The ancient surgeons, it must be agreed with Mr. Travers, "treated the veins with singular rudeness—pricking, cutting, tying, and burning them, without ever adverting to any other than the mechanical effects of such operations upon the diseases for which they were instituted." The use of the ligature in early days was empirical, the circulation of the blood in the vessels to which it was applied not being understood. It was supposed that the veins alone carried blood, and that when this fluid was found in the arteries the occurrence was altogether accidental; an error which was, however, pointed out by Galen in the second century. The treatment of hemorrhage from stumps of amputation was, therefore, of the most barbarous description, the red-hot iron being the favourite remedy, together with boiling tar, turpentine, oil, vitriol, and other astringents, until the middle of the sixteenth century, when Ambrose Paré substi-

tuted the ligature, which had only been used before his time as an exceptional measure, and one in which little confidence was reposed. To Paré is due the credit of having used a thread to restrain the bleeding from the vessels of an amputated limb, the ligature having been employed exclusively, before his great invention, for the treatment of aneurisms and wounded vessels. It is a great mistake to suppose that the old physicians were not well acquainted with the subject of hemorrhage, and equally as great a misconception to apply the term artery to "*vas*," which simply means a vessel, whether an artery or a vein.

Celsus, who flourished just before the Christian era, distinctly states that for the arrest of bleeding, the vessel is to be tied in two places, and the intermediate portion divided: "*Venæ quæ sanguinem fundunt apprehendendæ, circaque id quod ictum est duobus locis delegandæ intercidentæque sunt*," a precept which was followed for many centuries whenever the ligature was employed. Archigenes, who practised at Rome about the 108th year after the birth of Christ, speaks of sewing the bloodvessels after amputation. Somewhat later, Galen, who was well acquainted with the anastomoses of veins and arteries, advised torsion of the veins, or, if this failed, styptics or obstruents, avoiding the ligature, which would, however, sometimes be necessary. In this practice he was followed by Paulus Ægineta and Aetius. Of the early modern writers, we find that Avicenna, Averrhoes, Rhazes, Haly Abbas, Brunus, Theodoric, Roland, Lanfranc, Albucasis, Avenzoar, Guy of Chauliac, Hollier, Calmethens, Vesalius, Vigo, Tagaultius, Peter of Argelata, Andreas, Dalechamps, Bertapaglia, Benivieni, Marianus, Bolognini, Ambrose Paré, and many others, strongly advised the ligation of all bleeding arteries and veins, a course of practice which must be considered as a great advance on our own times.

In the eighteenth century, it was the common custom to include the vein with its corresponding artery in the ligature after amputations, or in the operation for aneurism. So general was this procedure that Guattani, in 1772, had to advise separation of the vein and nerve, to guard against the inconveniences ascribed to injury of the nerve alone:—

"In recommending ligation of the artery alone, without the vein and nerve, I do not think I depart in any way from what is reasonable and right, although I know full well that many high authorities, among whom I may mention the celebrated Mollinelli, are of the opinion that the separation of the vein and nerve from the artery, in the operation of aneurism is of but little, if of any moment." (*Observations on Aneurism*. Translated and edited by J. E. Erichsen. Svo. p. 271. London: Sydenham Society, 1844.)

It is not generally known that the celebrated John Hunter included the femoral vein in the ligature with the artery in his first three operations for popliteal aneurism. On this subject, M. Deschamps, 1797, also writes:—

"In the ninth case, I included within the ligature the whole bundle of vessels, that is to say, both the artery and vein. Some doubts have been thrown

upon the advisability of ligaturing veins, but the experience of all ages, as well as anatomical considerations, will serve to remove this imaginary dread. There are no principal veins as there are main arteries; they are so numerous, and their diameter is so great in comparison to arteries, that the return of blood is no way retarded, and I do not think that the surgeon need ever trouble himself about separating the vein from the artery." (*Ibid.*, p. 455.)

During the latter part of the same century, Desault urged ligation of the femoral vein and artery in thigh amputations: "When the two vessels are near to each other, as is generally the case, introduce one leg of the forceps into the artery and the other into the vein; draw them outward at the same time, and secure them by a common ligature. When they are at a distance tie them successively."¹

Authors of the Nineteenth Century in favor of Ligation of Veins.—Up to 1818, when Mr. Travers published his essay on the veins, but little reference had been made to the supposed dangers of venous deligation. In Great Britain and Ireland, at that time, the procedure was practised to a very limited extent, and the same statement is true at the present date. Professor Velpeau, by his example, did much to dispel the prejudices against the ligature in France, so that it is now regarded as a safe hemostatic agent in that empire. In Germany, Dr. Mikiewicz, Dr. Weber, and Dr. Neudörfer, have shown that the ligature is harmless, and I have been informed by the latter gentleman that its adoption has become almost universal. In this country, the teachings of Professors Mott, Pancoast, Gross, and Stone, have done much to correct the errors existing against its employment, so that it is very generally applied. Since there is a great difference of opinion as regards venous deligation, it may not be uninteresting or unimportant to record the views of the most prominent authors of all countries, of the present century, in favor of or against the procedure, premising, however, that the ligature is recommended in those cases only in which it is absolutely necessary.

Benjamin Bell, 1804, treating of large wounds of the veins, says: "The same remedy, therefore, should be employed here that we daily use in hemorrhage from wounds in arteries, namely, ligatures; which, when properly applied, never fail to answer the purpose." (*A System of Surgery*, 2d Amer. edit., p. 224. Troy, N. Y., 1804.)

Mr. Hey, 1805, writes: "Having seen a few instances of bleeding from the femoral vein, I generally inclose the vein in the ligature along with the artery." (*Practical Observations in Surgery*, p. 319. Phila., 1805.)

Mr. Chervier, 1806, says: "I know from experience that the principal vein of a limb may be included in the same ligature as the artery without any disadvantage ensuing." (*A Treatise on Gunshot Wounds*, 3d edition, p. 76. 1806.)

Professor Jameson, 1827, writing of the arrest of bleeding, remarks: "We have had occasionally, in depraved habits, to tie some of the larger veins; we have seen a number of veins pour out blood freely in such habits,

¹ The Surgical Works of Desault. By X. Bichat. Translated by E. D. Smith, M. D. pp. 476. Philadelphia, 1814.

and have arrested it by using the crooked needle, by means of which we included in an animal ligature a considerable portion of the surrounding structure, and our experience warrants us in saying that no injury will arise from using an animal ligature in that way, when it may be found necessary." (*Philadelphia Medical Recorder*, p. 37, vol. ii 1827.)

Baron Larrey, 1829, designedly tied the femoral, the larger branches of the internal saphenous, the brachial, and other veins, for hemorrhage, and never witnessed any accident which could be attributed to their inflammation. In his thigh amputations, he always tied the femoral vein with the corresponding artery, without once seeing any marks of the pretended phlebitis. "We can thus confidently include with the artery their accompanying veins, no matter how large, in spite of the opinions expressed by some physicians." (*Clinique Chirurgicale*, tome iii. pp. 485-489. Paris, 1829.)

Dr. Hennen, 1830, says: "Yet cases will occur, especially in amputation, where the large veins may, under certain circumstances, be secured with a fine ligature, not only without danger, but with advantage; in truth, if there were such imminent danger as has been apprehended, the needle, by which the vein was included in the same ligature as the artery, before the tenaculum came into general use, must have been a most destructive instrument: thousands of successful operations, however, attest the contrary."¹

M. Sabatier, 1832, remarks: "We should not hesitate to apply a ligature to a wounded vein."²

M. Sanson, 1835, would not hesitate to ligate when other means failed.³

M. Bégin, 1838, teaches that when large veins are divided in operations, it is almost invariably necessary to tie both ends.⁴

M. Dupuytren, 1839, says: "When the vein is nearly or completely severed, the ligature or compression must be applied between the wound and the capillaries."⁵

Mr. S. Cooper, 1842, writes: "A good deal of blood is sometimes lost from the mouths of the larger veins, and when they bleed much in debilitated subjects, I think Dr. Hennen is right in recommending them to be tied."⁶

M. Nélaton, 1844, says that "the ligature is employed with the same success on arteries and veins."⁷

Mr. Liston, 1846, writes: "Great danger is supposed to accrue from the application of ligatures to veins, and the practice is generally avoided; an open state of their divided extremities, after suppuration is established, is equally, if not more to be avoided."⁸

M. Malgaigne, 1846, says: "All the proceedings applicable to arteries are so also to veins."⁹

Mr. South, 1847, favors the ligature, and writes: "I have tied the femoral vein many times, and in but a single case with ill consequences; the

¹ Principles of Military Surgery, p. 151. Philadelphia, 1830.

² Médecine Opératoire, tome ii. p. 182. Paris, 1832.

³ Dictionnaire de Méd. et de Chirurgie Prat., tome iii. p. 231. Paris, 1835.

⁴ Nouveaux Éléments de Chirurgie et de Médecine Opératoire, 2d edit., vol. i. p. 376. Paris, 1838.

⁵ Leçons Orales de Clinique Chirurgicale, 2d edit., vol. vi. p. 555. Paris, 1839.

⁶ Surgical Dictionary, Amer. edit., p. 64. New York, 1842.

⁷ Éléments de Pathologie Chirurgicale, vol. i. p. 134. Paris, 1844.

⁸ Practical Surgery, 4th edit., p. 21. London, 1846.

⁹ Manual of Operative Surgery, translated by Brittan, p. 50 Phila. 1851.

patient had inflammation and pus in the iliac veins, but as this occasionally happens without a ligature having been applied, it may be questioned whether the ligature was the cause of the mischief or not."¹

Dr. Chelius, 1847, remarks: "If, however, bleeding from a large vein should continue, it is necessary to tie it; in such cases, for instance in amputations, in which I have frequently tied large veins, I have never observed any symptoms of phlebitis."²

Professor Gibson, 1850, is persuaded that the risks of the ligature are greatly exaggerated: "I only mean to imply that there is less danger in tying a vein than is commonly imagined. Influenced by this opinion, I ventured in the case I have related above, to tie the internal jugular in two places."³

Mr. Skey, 1851, writes: "I believe the reports of the danger consequent on the application of a ligature around a vein to be greatly exaggerated. In the case of a puncture, however, we have no reasonable alternative but the ligature, and I know of no evidence of any injurious consequences to the vein which would justify us in rejecting it."⁴

M. Sédillot, 1855, says that if large veins continue to bleed, we must have recourse to direct and immediate compression, or include them in a ligature.⁵

M. Richet, 1855, writes: "In very large wounds of the great venous trunks we must ligate."⁶

M. Velpeau, 1856, speaking of hemorrhage from veins of amputated limbs, thinks it would be wrong not to tie them: "The dangers of ligature, upon which so many surgeons have insisted for half a century, are shown to be farthest from the truth, and I should not be surprised to find that it would prove more advantageous to surround them immediately with a ligature, than to leave them free at the bottom of a wound."⁷

Mr. Macleod, 1858, entertains the same opinion as *M. Velpeau* and *Mr. Liston*: "It is a question on which it is difficult to decide whether or not, when pus absorption is so common as it was with us, it would not be justifiable practice to ligate the chief vein at the time of the operation. The views of *Mr. Travers* and others would certainly seem to oppose the adoption of such a step, but we have, on the other hand, the evident absorption of pus into the system by this channel; and, besides, numerous cases are on record in which the ligature of a vein has not only not been followed by evil results, but has absolutely been the apparent cause of preventing inflammation and pus absorption. This is particularly well illustrated in a case related by *Mr. Johnstone*, of St. George's Hospital, in the journals of 1857. In that case those vessels which had been tied were free both of inflammation and pus, while those not included in ligatures were full of pus and 'much inflamed.'"⁸

Mr. Moore, 1860, says: "Pressure is also sufficient to arrest the bleeding from the largest veins divided in amputations; though occasionally,

¹ A System of Surgery, by J. M. Chelius, M. D., translated by J. F. South, vol. iii. p. 644. Phila. 1847.

² Ibid., vol. i. p. 353.

³ Institutes and Practice of Surgery, 8th edit., vol. i. p. 209. Phila. 1850.

⁴ Operative Surgery, p. 198. Phila. 1851.

⁵ Traité de Médecine Opératoire, 2d edit., vol. ii. p. 193. Paris, 1855.

⁶ Traité Pratique d'Anatomie Médico-Chirurgicale, p. 152. Paris, 1855.

⁷ Operative Surgery, 4th Amer. edit., vol. ii. p. 2. New York, 1856.

⁸ Notes on the Surgery of the War in the Crimea, p. 393. London, 1858.

when the loss of blood may seriously affect the issue of the case, it is wisest to tie them."¹

Dr. Williams, 1862, writes : " In any case when pressure has failed to restrain hemorrhage from a completely divided vein, a ligature should be applied, first to the lower orifice, and secondly to the upper one, in the event of its bleeding from a retrograde circulation."²

Mr. Callender, 1862, in discussing the causes of suppurative phlebitis, makes use of the following emphatic language : " And it often occurs after amputation, as after other wounds ; not, however, in consequence of ligatures applied to veins after any such operation. Whether these vessels be tied or not, this inflammation may supervene ; indeed in every amputation, as remarked by Blandin, the veins which accompany small arteries are always tied ; and we have no right to argue that the ligature of a large vein is more likely to be followed by diffused inflammation of its wall, than is that of the smaller vessels. Such an assumption cannot be justified. Moreover, ligatures separate from veins, as already shown, without exciting inflammatory changes."³

Dr. Neudörfer, 1864, says : " It is self-evident that in those accidents, where ligation of a vein is practicable, to do it without hesitation, and without fear, since the danger of exciting phlebitis and pyæmia by ligating a vein is an exploded doctrine with surgeons."⁴

Mr. Solly, 1865, writes : " I can state, from the experience of more than thirty years in this large Hospital (St. Thomas's), that veins may be tied with impunity ; but I am also bound to add, that I have seen phlebitis follow the use of the ligature, and a fatal result the sequence, if not the consequence, of the practice."⁵

Dr. Weber, 1865, states that all the measures for restraining hemorrhage from arteries are applicable to the veins, and that the application of the ligature to the veins is free from danger.⁶

Professor Gross, 1866, says : " Great prejudice exists against ligating veins, but experience has shown that the fears that are entertained upon this subject are, if not entirely ill-founded, greatly exaggerated. The largest veins, as the internal jugular and femoral, have repeatedly been tied with impunity. I have myself never hesitated to adopt this treatment when occasion seemed to demand it."⁷

Authors of the Nineteenth Century Opposed to the Ligation of Veins.—

M. Roux, 1813, states that " if compression is insufficient to arrest the hemorrhage, it will be necessary to ligate the vein, an event, when practised, even more to be feared."⁸

Mr. Travers, 1818, is opposed to tying veins, as it sometimes gives rise to a diffused and fatal inflammation of the inner coat of the vessels.⁹

Mr. Allan, 1821, has seen the axillary vein cut and ligated in two instances of removal of tumours from the axilla. In one of these death ensued, on which account, he says : " I apprehend that the ligature should

¹ A System of Surgery, edited by T. Holmes, vol. i. p. 695. London, 1860.

² Costello's Cyclopædia of Practical Surgery, vol. ii. p. 528. London, 1862.

³ A System of Surgery, by T. Holmes, vol. iii. p. 303. London, 1862.

⁴ Handbuch der Kriegschirurgie, p. 69. Leipzig, 1864.

⁵ Surgical Experiences, p. 279. London, 1865.

⁶ Handbuch der Allgemeinen und Speciellen Chirurgie. Redigirt von Profs. Von Pitha und Billroth, vol. i. p. 166. Erlangen, 1865.

⁷ A System of Surgery, 4th edit., vol. i. p. 511. Phila. 1866.

⁸ Nouveaux Éléments de Médecine Opératoire, vol. i. p. 249. Paris, 1813.

⁹ Loc. cit., ut ante.

never be employed in wounds of the veins; more especially as the hemorrhage may always be easily suppressed by compression, either without or within the wound."¹

M. Lisfranc, 1845, has seen ligation of veins so often followed by phlebitis that he is very doubtful of the safety of the operation.²

Mr. Crisp, 1847, speaking of division of the veins, says: "Dangerous and fatal hemorrhage will sometimes take place from this cause, and it is occasionally necessary to have recourse to the ligature. It must be recollected, however, that the veins are more prone to diffused inflammation than the arteries, and on this account the use of the ligature should be avoided if possible."³

Mr. Wise, 1859, is opposed to the usual manner of ligating a vein by division of its outer coat, lest the dangerous irritation of its lining membrane be increased, and he proposes flat ligatures to approximate the sides of the vessels, which are to be removed in a few hours, or at the first dressing (*Op. cit.*, p. 369.)

Dr. Günther, 1859, believes the ligation of large veins to be injurious, as it may excite phlebitis, and, through it, pyæmia.⁴

Dr. Langenbeck, 1860, evidently thinks the ligature is to be avoided whenever it is possible, particularly in crowded hospitals, where the danger from thrombosis and pyæmia is increased; although he has narrated three examples of the procedure as applied to the internal jugular vein, he would, as a rule, avoid it. (*Op. cit.*)

Mr. Porter, 1863, says: "Surgeons in this country are not favourable to the practice of ligaturing a vein, although having the sanction of such authorities as Hey, Desault, and Hennen. The dangerous, and sometimes fatal phlebitis, following such procedure, has given us a wholesome dread of tying or in any way inflicting injury on these vessels."⁵

Mr. Miller, 1864, writes: "By every means in our power, we ought to avoid deligation of a vein. For, as will afterwards be seen, a form of phlebitis ensues, which, especially in its higher grade, is apt to spread; and, therefore, it need be no matter of surprise to find the very worst results of that disease supervening on the application of a ligature to a vein."⁶

Mr. Erichsen, 1864, says: "If the vein be one of considerable size, as the internal jugular; or if it be so situated that pressure cannot be brought to bear on it, it may require the application of a ligature; but this should, if possible, always be avoided, inasmuch as it is apt to occasion dangerous inflammation of the vessel."⁷

Mr. Pirogoff, 1864, is much opposed to the ligature, and remarks: "Suffice it to say that I have lost all my patients from pyæmia in whom I, and other surgeons in my presence, have been compelled to tie the femoral or axillary veins."⁸

It thus appears that there is a great difference of opinion among

¹ A System of Pathological and Operative Surgery, vol. ii. p. 432. Edinburgh, 1821.

² Précis de Médecine Opératoire, vol. i. p. 94. Paris, 1845.

³ *Op. cit.*, p. 334.

⁴ Lehre von den Blutigen Operationen am Menschlichen Körper. Erste Abtheilung, p. 55. Leipzig und Heidelberg, 1859.

⁵ Dublin Quarterly Journal, Nov. 1863, p. 269.

⁶ A System of Surgery, p. 229. Edinburgh, 1864.

⁷ Science and Art of Surgery, p. 154. London, 1864.

⁸ Grundzüge der Allgemeinen Kriegschirurgie, p. 440. Leipzig, 1864.

the authors whom we have mentioned as to the applicability of the ligature for the suppression of venous hemorrhage. The majority are in favour of the procedure, and the list might be largely increased, if we were to include those who advocate the operation in cases where compression is inapplicable, or death seems to be impending from alarming loss of blood. This difference of opinion may be due, in some measure, to an imperfect examination of the subject, very slight experience, or to prejudices in favour of or opposed to the procedure. The true reason, however, seems to depend upon a difference of sentiment in regard to the cause of pyæmia, which accident those authors, who are opposed to the measure, appear to fear most. The dangers of a fatal issue from this cause are, I am fully convinced, from a very extended investigation of the cases of ligation of veins, very greatly exaggerated, and I am sure that the surgeons who consider this accident as the most frequent cause of death, have either not examined the subject, or, at best, only very superficially, exhibiting that tendency, unfortunately too often seen to the detriment of the progress of science, in our profession, to adopt the opinions of men who justly hold a prominent position.

Phlebitis and Pyæmia as assumed Dangers.—It is not my purpose to enter into any extended inquiry into the various theories of the pathology of pyæmia, as the investigation of the subject would require too much space, and would be out of place. Suffice it to say that I regard the affection known as pyæmia as a zymotic disease, having for its exciting cause a vitiated condition of the blood, due to the introduction of a septic poison into the system, which may be called into action, and evince its peculiar phenomena from a great variety of secondary causes. It is just on this point that authors are not agreed, and it must, therefore, be expected that as long as primary phlebitis is held by many surgeons to be the cause of pyæmia, instead of the effect, just so long will they withhold the ligature for fear of exciting diffused or purulent phlebitis. The healthy, or adhesive inflammation of Mr. Hunter, such as is produced by the ligature, is an unimportant and perfectly innocent affection, just as necessary to the closure of a wounded or tied vein, as to the same conditions of an artery. The inflammatory action has for its object the formation of a clot and its adhesion to the inner wall of the vessel; and even when it oversteps this limit, it is often seen to be circumscribed by deposits of lymph, giving rise to an abscess within the walls of the vessel, which is thus cut off from the general circulation. I cannot agree with Mr. Travers, Mr. Callender, and other observers, that the thread acts “without exciting inflammatory changes.” How else are we to account for the injection and redness of the outer coats, the deposition of serum and lymph, the death of the portion of the vessel included in the ligature, and its subsequent separation by ulcerative action? If these authors mean to confine their statements to the lining membrane of the vein, I think they are correct, as numerous observations

and experiments have proved that it is difficult to produce marks of inflammatory action in that tunic. It may then be concluded that the changes take place in the external cellular tunic, and to a lesser degree in the middle coat, with, as Dr. Mackenzie thinks, an irritated state of the lining membrane.

Assuming, then, that unhealthy or suppurative phlebitis and its secondary effects depend upon a vitiated state of the blood, we are able to appreciate how it is that those affections may follow various dissimilar injuries, and reconcile the infrequency of their occurrence after operations involving the venous system. The dangers are not to be looked for when the general condition of the system of the individual is good, and when the walls of the vessels are in a healthy state; but they may be anticipated in enfeebled and broken-down constitutions, more particularly when the coats of the vessels are abnormally changed. Upon such a class of persons operative procedures should, therefore, if possible, be avoided.

The causes which predispose to the occurrence of phlebitis and pyæmia are those which favour the development of an enfeebled condition of the system, and a vitiated state of the blood, which shows a tendency to coagulate in the vessels. Thus bad food, exposure and scurvy, peculiar states of the atmosphere, the impure air of crowded hospitals, the puerperal state in feeble and nervous women, and certain protracted diseases, as gangrene, phthisis, Bright's disease of the kidney, and typhoid fever, strongly favour their occurrence. Of the traumatic causes, the most common are operations upon the bones and joints, injuries of the head, the shock and exhaustion following profuse loss of blood in surgical operations, and serious and extensive injuries. The extension of unhealthy inflammation from lacerated wounds, comminuted fractures, and wounds made in operative procedures, from the slightest puncture, as that made in phlebotomy, to the largest incisions, also favour their development. Mr. Guthrie considered that pyæmia was the most frequent cause of death after amputation. It may also arise from an abscess discharging its contents into an ulcerated vein, several examples of which accident connected with the internal jugular vein, are on record. In a very interesting paper entitled *A Pathological Inquiry into the Secondary Effects of Inflammation of the Veins*, Mr. Arnott has narrated ten fatal cases of pyæmia following venesection; two from wound of the femoral vein in the operation for popliteal aneurism; one after division, and one after excision of a portion of a varicose vein; and three after thigh amputations, in only one of which was a ligature applied to the femoral vein. The post-mortem examinations showed pus, or pus with lymph, in the vessel in fourteen instances; in two lymph was present, but no mention is made of pus; and in one neither fluid was apparent. Pyæmia and metastatic abscesses were also the causes of death in thirty-seven cases of injury of the head, the majority of which were attended with fracture or loss of portions of

the bone. Mr. Arnott, therefore, concludes that "these considerations show that the secondary effects of phlebitis are connected with a vitiated state of the circulating fluid; a further proof of which may be found in the yellow colour of the skin, so constantly observed in cases of this disease."¹

An altered state of the blood, and not the existence of primary phlebitis, must then be regarded as the starting point of these morbid changes; and in idiopathic cases the spontaneous coagulation of the blood gives rise to secondary phlebitis and to metastatic abscesses in the different tissues and organs of the body. By the application of a ligature to a vein, or in any of the operations for varicose veins, either by caustics, compression, or by subcutaneous ligation or division, we cause a coagulum to form as a result of mechanical irritation of the vessel itself; and coagula also form whenever a vein is partially or completely divided, without the application of a thread. Upon the quality of these concretions will depend the issue of each case. Thus if the fibrin be deposited from an impoverished or morbidly altered blood, these clots will soften and become broken down into a puriform fluid, which will give rise to a train of symptoms denotive of the occurrence of pyæmia, or of acute phlebitis. From the fact of the disintegration commencing at the centre of the clots, additional evidence is afforded of the blood, and not of the walls of the vein, being the origin of the disease. If, on the other hand, the clot be the result of irritation of a vein occurring in a person in whom the circulating fluid is healthy, the worst event that can follow will be simple obstruction or obliteration of the cavity of the vessel.

The Ligature, if properly applied, not the Cause of Pyæmia.—The most common predisposing causes of pyæmia are the slight puncture made by the lancet in venesection, the extension of inflammation from unhealthy stumps and wounds into open veins, and operations on the veins and on the bones in which the venous orifices are patulous. The ligature has also been accused of being productive of the same occurrence, and it, therefore, becomes a very important inquiry whether it has any agency in the mortality of operations. From the preceding considerations of the pathology of phlebitis—and for further information on this subject, the very interesting work of Mr. Henry Lee,² and the contributions of Mr. G. W. Callender,³ may be consulted—it is seen that the formation of a clot is sometimes the consequence and sometimes the cause of phlebitis, the former depending on a vitiated blood, the latter on irritation of the vessels; and that the subsequent changes in the clot determine the morbid phenomena. It is not, however, to be inferred that the coagula are always necessary

¹ Medico-Chirurgical Transactions, vol. xv. p. 61. London, 1829.

² On Diseases of the Veins, Hæmorrhoidal Tumours, and other Affections of the Rectum. Second edition. London, Churchill, 1866.

³ A System of Surgery. Edited by T. Holmes, vols. i. iii. London, 1860-1862.

to the production of pyæmia, or the healing process of wounded veins, since they are sometimes altogether absent. The clot of a ligated vein is more delicate and smaller than that of a divided vein, and it is the extension of the clot into the latter that so often proves the source of pyæmia after amputations. After a very careful examination of the whole subject, *I do not hesitate to state that the occurrence of pyæmia, when of traumatic origin, is due to the wound of the vessel itself, and not to the ligature; that a predisposition to the disease, or, rather, a peculiar morbid condition of the blood, is necessary for its development; and that when that predisposition exists, the affection may show itself whether the vein has been tied or not: in other words, when the coats of the vessel are healthy, and the condition of the blood is normal, the ligature is never the starting-point of pyæmia.*

In making this assertion—the “exploded doctrine” of Dr. Neudörfer—I am aware that I shall meet with much opposition, and be expected to support my views by facts. By referring to “Table No. I.” “Fatal Cases of Wounds of the Internal Jugular Vein,” it will be seen that twelve cases were fatal secondarily, five from hemorrhage, *five from pyæmia*, and two from other causes, and that in none of the cases was any mode of treatment adopted, much less the ligature. On referring to “Tables II. and III.” it will be seen that the same vein was ligated in forty-one instances, and that the deductions are based on forty cases, in which the results are known. Death is referable to the employment of the ligature in five cases only, and of these four were carried off by secondary hemorrhage, and *but one by pyæmia*, and in that case no post-mortem examination was held, so that it really proves nothing. Let it be added that the ligature was required in all the cases to prevent death either from the loss of blood or from the introduction of air, and that the vein was wounded in twenty-eight of the cases in the removal of tumours of the neck. May it not, then, fairly be concluded that the ligature had nothing to do with the fatal case of pyæmia, but that the operation itself was the cause of death; showing the very remarkable result of mortality from pyæmia in the extirpation of tumours of the neck of only 3.57 per cent.

I have also collected fifteen cases of ligation of the axillary vein, and twenty of the external jugular—and the list could have been much extended—without one death from pyæmia. The conclusion has, therefore, been forced upon me that *the ligature must be excluded from the category of the predisposing causes of pyæmia.*

The Ligature as a Means of Preventing the Extension of Unhealthy Inflammation.—On reviewing the opinions of the authors not opposed to tying veins, one cannot fail to be struck with certain expressions showing that the ligature is not only not to be avoided, but that its use is indicated, when pyæmia prevails epidemically, or when the elements of that affection are supposed to pre-exist in the system of the individual. Dr. Hennen

states that large veins may be tied, not only without danger, but with advantage. After suppuration of a wound had taken place, Mr. Liston feared an open state of the divided extremities of veins much more than when a thread had been applied. M. Velpeau says that he would not be surprised to find that it would prove more advantageous to surround the divided veins immediately with a ligature than to leave them open at the bottom of a wound. Mr. Macleod, writing of the mortality of amputated cases from pyæmia in the Crimea, questions whether it would not be better to tie the chief vein of amputated limbs, to prevent the evident absorption of pus by that channel. Numerous recorded cases, he remarks, show not only no ill effects from the procedure, but that it has absolutely been the apparent cause of preventing inflammation and the absorption of pus. The frequency of pyæmia after amputation is attested by the experience of all surgeons. Mr. Bryant gives it as the cause of death in 42 per cent. of all fatal cases of amputations, and in 10 per cent. of all amputations, the observations having been based upon 300 cases.¹ If the changes preceding the appearance of the signs of systemic infection are to be looked for in the clot in the interior of the vessel, it is of primary importance to induce a coagulum of small size. The clot which extends into the open extremity of a divided vein of a stump is larger than that produced by the application of a ligature, so that the latter expedient would seem to be indicated. This is particularly well seen in the case of Mr. Johnston, quoted by Mr. Macleod, in which "*those vessels which had been tied were free both of inflammation and pus, while those not included in ligatures were full of pus and much inflamed.*"

The extension of local inflammation to neighbouring veins when a ligature has not been used is well shown in the table of fatal wounds of the internal jugular vein, before referred to. Pyæmia was the cause of death in 25 per cent. of all the cases, and in 41.66 per cent. of all the cases secondarily fatal. In all, abscesses had formed about the sheath of the vessels. In Case XIV. the small veins in the neighbourhood of the abscess were filled with broken-down coagula. In Case XVI. there was an abscess of six ounces' capacity between the vertebral column and the sheath of the vessels, and the vein showed marks of high inflammatory action. An abscess had also formed in Case XVII. behind the vessels, and the post-mortem inspection on the fifteenth day after the injury indicated a round opening in the internal jugular vein, two lines in diameter, and the cavity of the vessel occupied by a broken-down clot. It is proper to add that in this case M. Tacheron would have applied a ligature, had it been possible to do so. In Case XVIII. the wound was open, the coats of the vein were infiltrated with lymph, and the interior filled with fibrin, while the neighbouring veins showed the effects of phlebitis. By contrasting these cases

¹ "On the Causes of Death after Amputation." *Medico-Chirurgical Transactions*, vol. xxiv. 2d Series. London, 1859.

in which the ligature was withheld with those in which the jugular vein was tied, it may fairly be assumed that *the ligature may prevent diffused inflammation of the walls of a vein and the phenomena included under the general term of pyæmia.*

In the preceding considerations, which refer to the safety of the ligature when properly applied, I have endeavoured to show that venous deligation is not to be avoided from the fear of exciting pyæmia. I have now to consider some of the causes which may produce that affection, under unfavourable circumstances, in the case of the internal jugular vein.

The Ligature Improperly Applied as a Cause of Diffused Phlebitis.—In the operation for aneurism it occasionally happens that the accompanying vein is transfixed by the aneurism needle, and if the mistake be not discovered, and the ligature withdrawn and applied at another point, it will act as a seton within the cavity of the vessel, and induce the train of symptoms referable to diffused phlebitis and the production of systemic infection. A number of such fatal cases are on record, in which the femoral vein has been pierced in the Hunterian operation for popliteal aneurism. The following cases of death from wounds of the internal jugular vein were evidently due to this accident producing pyæmia, although it is not so stated by Mr. Arnott in his paper “On the Secondary Effects of Inflammation of the Veins,” before mentioned, nor by Professor Van Buren, of New York, in the second case.

CASE I.—“A young man had a ligature placed on the left carotid artery for an aneurismal disease of one of its temporal branches. Considerable difficulty was experienced in passing the needle round the vessel. Venous hemorrhage took place during the operation, recurred at night, and occasionally afterwards, for nine or ten days. On the fifth day after the operation, the patient had a severe rigor, succeeded by heat of skin and general febrile symptoms. These increased, the pulse rose to 120, and the constitutional disturbance assumed a very violent character. About the tenth day, the vision of the left eye became impaired, and was quickly lost, the pupil was contracted, the iris immovable, and the cornea had a somewhat hazy appearance; effusion took place under the conjunctiva, and the eyelids were greatly swollen, giving the appearance of the globe being much protruded; at the same time, there was a degree of deafness, considerable stupor, with occasional slight delirium. In the course of a few days the coats of the eye sloughed at the upper part, and its contents were evacuated. Whilst these changes were occurring in the eye, collections of matter formed without pain in different parts of the body, on both shoulders, above the insertion of the deltoid muscles, over the sacrum, &c. The constitutional disturbance abated, the collapsed eye healed over, but he never recovered his health. Five months subsequently he died, labouring under lumbar abscess, and worn out by hectic. On examination of the body, at which I was present, a portion of the jugular vein, to the extent of two inches, was found wanting; the upper and under extremities being shrunk, ligamentous, and gradually lost in the cellular substance. On opening the head, pus was found effused in great quantity between the tunica arachnoidea and pia mater, along the base of the brain, and the whole length of the spinal cord. The inter-muscular cellular substance of the loins was loaded with pus. The viscera of the abdomen and chest were not examined.”

CASE II.—A man, twenty-five years of age, entered the New York Hospital, with exophthalmia of the right eye, due to a pulsating encephaloid tumour of

the orbit. On the 10th of May, 1857, Professor Van Buren tied the primitive carotid artery, and for a week every symptom promised well. On the eighth day, severe rigors occurred, followed by quick pulse, hot skin, sweats, prostration, and other evidences of pyæmia. The wound opened, and a thick, chocolate-coloured fluid was discharged, with occasional expulsion of large clots of blood on coughing. This continued until the death of the patient on the thirteenth day after the operation. On examination of the body, the wound presented a cavity of almost double its original extent; its walls were formed by dark sloughy tissue, "and at its bottom the ligature was found still slightly attached to what seemed to be a portion of the sheath of the vessels, the carotid artery having been entirely cut through, and its divided extremities retracted from each other to the distance of three-fourths of an inch." The artery was closed at both extremities, but "at a point opposite to the attachment of the ligature, and for the space of an inch in extent, the internal jugular vein was open, so that the handle of the scalpel could be readily passed into the vessel upward and downward; its coats having been destroyed throughout nearly half of its circumference by ulceration or sloughing." This lesion explained the symptoms of pyæmia, and the source of the discharge of clotted blood. "On examining the thoracic viscera, several abscesses as large as English walnuts were found in the substance of each of the lungs, and a number of smaller ones on their surface." (*New York Journal of Medicine*, July, 1857, p. 48.)

The mere Exposure of a Vein as a Cause of Diffused Phlebitis.—Another occurrence, fortunately infrequent, which may give rise to diffused phlebitis or pyæmia, is the laying bare of large deep veins, without any injury whatever to their coats, or the production of a mere bruise. On this subject, M. Broca, referring to the dangers of the operation for aneurism, writes:—

"Another accident, less frequent, but more serious than secondary hemorrhage, is purulent phlebitis of the vein which accompanies the ligated artery. This vein, often bruised during the operation, remains denuded at the bottom of a wound in which suppuration is almost inevitable, and it is easy to understand, under such circumstances, that it frequently becomes inflamed. Phlebitis is a very serious complication in itself, and much more so in the present case, because it is generally seated in a very large vein. When it becomes purulent, it gives rise to a purulent infection which is soon fatal; and when it is limited to obliteration of the vein by clots, it opposes to the circulation of the limb, already compromised by ligature of the artery, a new obstacle, which favours the production of gangrene." (*Des Anéurysmes et de leur Traitement*, p. 478. Paris, 1856.)

A case, of which the following is an abstract, demonstrating the truth of the remarks of M. Broca is narrated by Dr. James R. Wood, of New York, in his very interesting paper, "On Ligature of the Common Carotid Artery." Professor Post tied the common carotid for a large subcutaneous erectile tumour of the cheek. "In opening the sheath of the vessels, the deep jugular vein was not exposed. The patient appeared to be doing well for several days after the operation, after which he had rigors, with low delirium and irritative fever. He died, as nearly as I recollect, about the eighteenth day after the operation. On making the autopsy, the deep jugular vein accompanying the artery which had been tied, was found inflamed with pus in its cavity." (*New York Journal of Medicine*, July, 1857, p. 42.)

The following cases, presenting remarkable points of similarity, also bear directly upon the observations of M. Broca:—

CASE I.—Professor J. C. Warren, of Boston, removed the right clavicle for osteo-sarcoma. The subclavian vein was exposed in the whole extent of its course, as was also the lower third of the internal jugular. On the thirteenth day, the patient was seized with chills, the pulse rose from 80 to 112, he suffered

from great nervous agitation, and was slightly delirious. Death ensued on the 28th day. The post-mortem inspection showed the subclavian and jugular veins and the upper portions of the axillary and cephalic veins blocked up with firmly adherent coagula. The right pleural apex corresponding with the wound was covered with lymph, but the membrane was uninjured. The lower edge of the right lung was also the seat of lymph deposits, and the effusion was more considerable on the left side, with two or three spots nearly an inch in diameter, in the substance of the lung. The left pleural sac contained sanguinolent fluid. (*American Journal of the Medical Sciences*, Nov. 1833, p. 17.)

CASE II.—Professor Langenbeck removed the left clavicle for fibroid disease. The subclavian and internal jugular veins were exposed, and the former vessel was dissected off with difficulty. On the third day the patient, after a bad night, was seized with chills, and the pulse rose to 130. On the fifth day he was very restless, the intellect was clouded, the respiration short and quick, and he rapidly sank. The internal jugular vein was found to be occupied by a long, slightly adherent thrombus. The left pleura was not wounded during the operation, but was thickened by yellowish gray effused lymph, and the sac contained a very copious lymph exudation. (*Arch. für Klinische Chirurgie*. Band I. p. 8. Berlin, 1869.)

The True Danger from Ligating a Large Vein.—It is to be observed from the foregoing remarks that I have endeavoured to place the subject of venous deligation in its proper light, and demand for the ligature the same recognized position as a venous hemostatic agent, that it has acquired for the arrest of arterial hemorrhage. I have also, I think, adduced sufficient evidence, based upon tying the largest vein in the system to which surgical remedies are applicable, to prove that the fears of the production of diffused phlebitis, so much insisted upon by some authors, and so readily acquiesced in by a portion of the profession, are groundless. I have shown that pyæmia has resulted in but one case of the extirpation of a tumour of the neck in which the internal jugular vein was tied, and that the vein has been tied forty-one times; and also that pyæmia has followed five wounds of the internal jugular, for which there was either no treatment adopted, or the plan of treatment is not mentioned; that the same affection carried off two cases in which the vein had been transfixed by the thread in tying the common carotid artery; and, finally, that it was the cause of death in three operations in which the vein was simply exposed, a thrombus being present in the vessel in every one.

Since, then, pyæmia is not to be regarded as a cause of death after tying a vein, it may be asked what is the real danger attending the procedure? To this I answer it is precisely the same as that which results from arterial ligation, namely, *secondary hemorrhage*, coming on about the time of the separation of the thread. So preoccupied do authors appear to have been with the assumed danger of diffused phlebitis that they have not even mentioned secondary hemorrhage as a cause of death, and I was myself not at all aware of its frequency as a source of mortality, until I undertook the present investigation, which shows it to be eighty per cent. of all the fatal cases referable to the ligature.

The other dangers and inconveniences from tying veins are connected

with the state of the collateral circulation, and include gangrene below the seat of the ligature, apoplexy, softening of the brain, and other cerebral disorders, œdema, and dropsical effusions. The head affections will be alluded to in this paper, while the other dangers will be considered at a future time.

WOUNDS OF THE INTERNAL JUGULAR VEIN.—The internal jugular vein, continuous above with the lateral sinus, collects the blood from the interior of the cranium and the greater part of the head and neck. At its origin there is a dilatation, known as the sinus of the vein, and it is here closely adherent to the jugular fossa. Opposite the larynx its capacity is the greatest, the enlargement being the consequence of its having received several large branches; and it becomes somewhat contracted below, where it empties into the innominate vein. Upon its anatomical structure and relations, therefore, will depend the gravity of wounds inflicted upon it. The walls of the vessel are comparatively thin, its capacity is large, and the flow of blood through it is influenced by gravitation and by the absence of valves, so that there will be considerable regurgitation below.

If the vessel be divided in the inferior third of its course, the orifices will remain open, and its walls not collapse, owing to their connection with the deep cervical fascia, and here the danger to life from reflux bleeding and from the introduction of air, is greatest, the hemorrhage being more copious from the central or cardiac end during natural expiration, and during the convulsive motions of the expiratory muscles, as in crying, sneezing, and coughing. The introduction of air will take place during inspiration. Division of the vessel in its middle and upper thirds is not attended with equal danger, as the influence of the respiratory movements is not as much felt, and the walls of the vein have a tendency to fall together. Hemorrhage in these cases will occur from the peripheral or distal divided end, little, or no blood at all, flowing from the central extremity.

Should the vessel be injured near the base of the skull, fatal bleeding will ensue, provided there be a free external outlet; a recovery from a wound in this situation has not been recorded. It should also be taken into consideration that this vein, in common with the venous system at large, possesses very feeble contractile powers; and also that the capacity of the veins increases with age; so that, if wounded, the loss of blood will be greater in old persons and in debilitated constitutions, as in these conditions the capacity of the veins is much increased, whilst the arterial capacity is in a corresponding degree diminished.

From the above considerations it is to be observed that wounds of the internal jugular vein must be classed among the most dangerous and fatal of accidents. *Provided there be a free external opening for the escape of blood, they are equally as formidable as corresponding injuries of the*

carotid artery. In the latter case, should instantaneous death not ensue, the formation of a protective clot will be favoured by a state of syncope and by the contraction and retraction of the coats of the vessel. In the case of the jugular vein, fainting does not very materially assist coagulation, and the vessel does not contract. Add to this the dangers to life from the aspiration of air, the occurrence of phlebitis and pyæmia, with the following results, and my statement will prove to be correct. Cases of recovery from gunshot injury of the carotid artery are on record; but I have been unable to find a single example of similar lesion of the internal jugular vein attended with so happy a result. On the contrary, all the cases have proved fatal; 62.5 per cent. from secondary hemorrhage, 25 per cent. from pyæmia, and 12.5 per cent. from primary hemorrhage. All incised or punctured wounds, *not made by surgeons in operations*, have likewise ended in death; 50 per cent. from primary hemorrhage, and 50 per cent. from pyæmia. Of suicidal wounds there are eight examples, with two deaths and six recoveries; but of the latter, the ligature was employed in four, compression in two. The aspiration of air was the cause of death in four cases; the results of all other cases will be given under the head of treatment.

Wounds of the internal jugular do not differ from wounds in other tissues as regards the weapons with which they are inflicted, and may be incised, contused, punctured, lacerated, or gunshot. They are most commonly made by the surgeon in the extirpation of tumours of the neck; as in many of these cases the vein will be found to be intimately attached to the morbid growth, or imbedded in it, or displaced from its normal position, thus rendering it very liable to be opened. If the precaution be not taken to tie or compress the wounded vein, alarming hemorrhage, or death from the introduction of air, may ensue. Any one who has been unlucky enough to puncture or divide the vessel, cannot have failed to have been struck by the copious and embarrassing bleeding, and the difficulties of applying a ligature, particularly in the upper part of the neck.

Injuries of this vessel have occupied the attention of surgeons from time immemorial; and yet it is strange how few cases have been reported. Paulus Ægineta treats of them. Ambrose Paré, in his Chapter on "Wounds of the Neck," written upwards of three hundred years ago, says:—

"Celles des veines jugulaires et arteres carotides, estans grandes, sont mortelles, pource qu'elles ne peuvent estre estreintes et comprimées par ligatures, à cause que le col ne peut estre fort serré, qui l'on ne suffoquast le malade: au moyen de quoy s'ensuit un flux de sang, qui est cause de mort." (*Œuvres Complètes d'Ambrose Paré.* Par J. F. Malgaigne. Vol. ii. p. 90. Paris, 1840.)

And yet Paré narrates three cures by compression, which will be given in their proper place.

Dr. HENNEN, treating of injuries of the neck, uses the following language:—

"I omit saying anything on wounds of the jugulars, or carotids; gunshot openings of them I hold to be so universally fatal that any exceptions may be looked upon as merely serving to confirm the general rule. (*Principles of Military Surgery*, p. 286. Phila., 1830.)

As I have shown, Dr. Hennen was perfectly correct in this opinion; but the statement of Professor Boyer is remarkable:—

"When the large veins of the thoracic or abdominal cavities, and the internal jugular are wounded, the injury is beyond the resources of art and the patient dies of hemorrhage. Death has also supervened in the cases in which the internal jugular has been tied." (*Traité des Maladies Chirurgicales*, 5th edit., vol. ii. p. 422. Paris, 1845.)

The above statement of Professor Boyer—and it occupies about as much space as authors generally devote to this injury—is perfectly gratuitous, and liable to mislead the reader. It is the more astonishing, as, at the time the sentence was written, not less than fifteen successful cases of ligation of the internal jugular had been reported, as well as several cures by compression.¹

The following fatal cases, in which no treatment was employed, or the treatment is not mentioned, are separated into different classes for greater convenience of reference.

I. *Cases of Death from Primary Hemorrhage.*—The number of recorded cases of death from primary hemorrhage is very small, the following being the only ones that I have been able to discover:—

CASE I.—M. Vallée saw a soldier who had been stabbed in the neck, the right internal jugular vein being almost completely divided. The edges of the wound were retracted and the vein was empty. Death was almost instantaneous. (*Gazette Médicale*, p. 267. 1837.)

CASE II.—Mr. Bryant reported to the Pathological Society of London the case of a girl, nine years of age, who, one hour previous to her admission into Guy's Hospital, Nov. 1st, 1856, whilst carrying a chamber utensil in her hand, stumbled, and fell on the broken china. She bled freely at the time, and no other means than the application of adhesive plaster had been adopted. On admission she was pulseless and dying. There was a cleanly cut wound on the right side of the neck, one inch long and one inch external to the thyroid cartilage. There was no bleeding, but the child died in five minutes. On inspection it was found that the sharp edge of the broken china had made a clean V-shaped incision of the outer wall of the internal jugular, one-fourth of an inch in extent. (*Trans. of Path. Soc. of London*, vol. viii. p. 101. 1857.)

CASE III.—"During the summer of 1859, one of the inmates of St. George's Hospital committed suicide by cutting her throat. She was almost immediately seen by the house surgeon, but had already ceased to breathe, and was quite

¹ It may here be remarked that some cases of ligation of the internal jugular vein have been incorrectly reported. Thus M. Velpeau gives Professor Miller, of Kentucky, the credit of having cured a patient by the ligature; whereas that gentleman ligated the primitive carotid and suppressed the venous hemorrhage by compression. Professor Henry Smith, of this city, states, in his work on surgery, that the late Dr. Randolph tied the internal jugular during the extirpation of the parotid gland. The external jugular was the vessel involved. I have been very careful to avoid such errors by referring to the original reports, which have in most instances been accessible.

pulseless. There was a deep gash in her throat, dividing the left common carotid artery, and wounding both internal jugular veins." (Mr. Henry Gray. *Holmes' System of Surgery*, vol. ii. p. 277. London, 1861.)

CASE IV.—Mr. Samuel Cooper has recorded a remarkable and unique case of death from primary subcutaneous hemorrhage. The patient, a soldier, had been shot, the ball entering behind the mastoid process, and passing downwards and forwards towards the sternum. The internal jugular was divided: the man lived for more than an hour, but was suffocated by the pressure of the large mass of extravasated blood on the trachea. (*First Lines of the Practice of Surgery*, vol. i. p. 529. New York, 1822.)

II. *Cases Fatal from the Introduction of Air.*—Wounds of this vein have been attended with the introduction of air in eleven instances, four of which were fatal. The cases of Wattman, Asmus, Brodie, and Morton, recovered, as will be seen in table No. II., although ligatures were applied to the vein. The case of Dr. Smith recovered from the effects of air, but died of exhaustion on the tenth day. The cases of MM. Velpeau and Bégin, referred to under the head of treatment by compression, resulted in a prompt cure. In ten of these cases the vein was injured during the removal of tumours, and in the eleventh the vessel had been divided in a suicidal attempt. It will thus be observed that the introduction of air was, in every case, the result of an incised wound, and after a very careful examination of a large collection of works on military surgery, I can safely state that there is not a single recorded instance of death from this accident following a gunshot injury.

In the following fatal cases, death occurred, in two, almost instantaneously; in one, in three hours and a half; and, in the fourth, after the lapse of seven days:—

CASE I.—Dr. Ulrich, of Berlin, 1834, divided the internal jugular in removing a tumour from the side of the neck. Not a drop of blood flowed, although the vessel remained patulous, and the assistants heard a whizzing sound. Soon, however, frothy blood welled from the inferior extremity: syncope ensued, with convulsive movements of the face and opisthotonos. The countenance became pale, the pulse small and tremulous, the respiration slow, and the man died at the expiration of a minute. On dissection, fifty-two hours after death, the vein was found imbedded in the tumour and obliterated a little above the point of its division. The right auricle was elastic and distended, and contained no blood. The blood of the right ventricle was fluid and black. (*Compendium de Chirurgie Pratique*. Par MM. Bérard et Denonvilliers, vol. i. p. 80. Paris, 1840.)

CASE II.—M. Gorré, of Bologne, 1842, in the removal of a cancerous growth of the left side of the neck, when he was dividing the last attachments, heard an unmistakable *glouglou*. The patient grew pale, the breathing was accelerated, and he died in about one minute. A post-mortem examination was made at the expiration of twenty-four hours, when the internal jugular was found to be opened about eight lines above the clavicle. The wound was oblique, about three lines long and gaping, and on compressing the vein from below upward, gave issue to spumous blood. The right auricle and ventricle, the superior vena cava, subclavian, axillary, brachial, and superficial veins of the brain contained blood mixed with air. (*Annales de la Chirurgie Française et Étrangère*, vol. vi. p. 305.)

CASE III. M. Mirault, of Angers, 1837, wounded the internal jugular, whilst separating a fibrous tumour of the right side of the neck from its deep connec-

tions. A whizzing sound was distinctly heard, repeated in a few seconds, when the face became livid, and there was a general trembling, with tetanic convulsions. The wound was filled with black blood, and the patient had ceased to respire. A ligature was thrown around the vein, and, after the lapse of eight minutes, under appropriate measures, the patient completely recovered and the operation was finished, about eight ounces of blood having been lost. The vein had been divided to the extent of one-half of its calibre, about an inch and a half above the clavicle. The patient was placed in his bed; his voice was weak, and his respiration a little lowered. Intense chilly sensations soon came on, and, at the end of three hours, M. Mirault found him presenting all the signs of suffocation, in which condition death ensued in about ten minutes. An autopsy was denied. (*Comp. de Chir. Pratique*, vol. i. p. 80.)

CASE IV.—M. Roux, 1832, divided the internal jugular in the removal of a tumour from the parotid region. Air was heard to enter the vein with a whistling sound, the breathing became much embarrassed, and the patient, a girl, was strongly convulsed. The vein was compressed, and, under the use of stimulants, she shortly recovered. Two ligatures were thrown around the tumour, which was not extirpated at the time, but on the sixth day, having become disintegrated, it was easily removed. On the following evening she died in a state of coma. On post-mortem inspection the internal jugular was found to be divided, the cavities of the heart were empty, and the aorta and iliac arteries contained air. The venous system presented no abnormal appearances. (*Gazette Médicale*, 1833, p. 498.)

Gunshot wounds of the internal jugular, if not immediately fatal, as they are very apt to be, are exceedingly liable to be followed by secondary hemorrhage and pyæmia, which usually terminate in death. In fact, I have not met with a single example of these injuries where the vein alone was involved, followed by recovery. Five of the seven cases here recorded proved fatal from secondary bleeding, in a period varying from four to fifteen days, and two died of purulent infection.

III. Cases of Gunshot Wound Fatal from Secondary Hemorrhage.

CASE I.—In April, 1849, Dr. Stromeyer had a case of gunshot fracture of the lower jaw, the bullet entering near the chin on the left side, and driving the spicula deep into the throat. "When I first saw him he was in imminent danger of suffocation, from which I freed him, by removing, by means of the left index finger introduced into the mouth, many large and sharp fragments from the neighbourhood of the larynx. He died suddenly on the fourth day, in the presence of his attending physician, a thick stream of dark blood issuing from the mouth." Warm poultices had been substituted for cold applications contrary to Dr. Stromeyer's orders. The autopsy showed an opening in the internal jugular vein, made by a splinter of bone, which still remained in it. (*Maximen der Kriegsheilkunst*, 2d edit. p. 131. Hanover, 1861.)

CASE II.—Professor Langenbeek relates the case of a young man, who was shot in a duel with pistols. The ball, which entered the mouth from right to left, shattered two teeth, broke the ramus of the jaw, and was perceptible on the left side of the neck. A copious hemorrhage of short duration followed. On the eighth day, secondary hemorrhage by the mouth suddenly carried the patient off: on inspection of the body, the left internal jugular was found to be torn. (*Archiv für Klinische Chirurgie*, vol. i. p. 22. Berlin, 1860.)

CASE III.—Dr. Hennen has recorded the following case: "A soldier of the Brunswick Oels., was struck at Waterloo by a musket ball on the tip of the nose, which split upon the bony edge where it is joined by the cartilage. A piece of the ball was extracted upon the spot, and it was supposed that the ball

itself had been purposely cut into pieces, as is sometimes done by foreign riflemen. On the 10th day the man was seized with a violent hemorrhage from the mouth and nose, which came on suddenly, and carried him off in the course of the night. On dissection, it appeared that a very minute portion of the ball had penetrated along the basis of the skull, lodged in the sinus of the left internal jugular vein, forming a sort of sac for itself close upon the vein, which, having inflamed the coats of the vessels, at last ulcerated and burst. The case occurred in the practice of my friend Dr. Pockels, now Surgeon-in-chief of the troops of Brunswick." (*Principles of Military Surgery*, p. 90. New York, 1830.)

CASE IV.—M. Jobert de Lamballe, treating of gunshot wounds of the neck, mentions a case of M. Delpech, who cured a man of wound of the primitive carotid, too low down to be tied. Secondary hemorrhage ensued, and Delpech employed Valsalva's treatment. The patient was bled very frequently, and ultimately recovered. "In a similar case, I imitated Delpech. Indeed, I was congratulating myself upon having followed his example in a man who, in the disturbances of July, was shot, the ball wounding the primitive carotid and the internal jugular vein of the right side. Venesection frequently repeated had already notably diminished the amount of blood which escaped from the wound at different times: fifteen days had elapsed since the reception of the wound; I had great hopes; but in consequence of a violent effort on the part of the patient, a frightful hemorrhage produced death." (*Plates d'Armes à Feu*, p. 159. Paris, 1833.)

CASE V.—"A wound from firearms proved fatal in fifteen days; the autopsy disclosed a communication between the internal jugular vein and the carotid artery. The ball was underneath and in the jugular itself. I have seen the specimen." (Prof. Velpeau, *New Elements of Operative Surgery*, vol. i. p. 860. New York, 1856.)

IV. Cases of Gunshot Wound Fatal from Pyæmia.

CASE I.—Dr. Schwarz met with a case in which a rifle ball had entered the mouth, shattered the left lower jaw, and penetrated the neck, tearing the internal jugular vein to the extent of a few lines. The missile remained at the opening of the vein, and therefore permitted the escape of only a few ounces of blood into the surrounding tissues. It was not removed, although it was felt in the swelling. Suppuration ensued, with death from pyæmia.

An autopsy showed a completely healed rent in the outer wall of the vein, the cylinder of which was slightly diminished but free. At the cicatrice the coats of the vein were thickened by plastic deposits, and a very adherent, semi-organized layer of lymph coated the lining membrane. The small veins in the neighbourhood of the abscess, in which the ball lay, were filled with broken-down coagula. (*Archiv für Klinische Chirurgie*, vol. i. p. 23.)

CASE II.—On the taking of Colding, Dr. Stromeyer saw a Schleswig-Holstein soldier who had been shot in the right side of the lower jaw in front of the insertion of the masseter muscle. The ball found its way under the tongue and the left side of the lower maxilla, behind the sterno-cleido-mastoid muscle, where it was felt on a level with the top of the larynx, but was not removed. There had been no hemorrhage. The patient died at the expiration of three weeks of pyæmia.

On the autopsy, an abscess was found behind the left sterno-cleido-mastoid muscle, in which lay the flattened bullet near to the vertebral column. "The internal jugular vein had been torn to the extent of five lines on its anterior and outer aspect; but the rent was completely healed, as the coats of the vein had applied themselves to it behind, and were united, so that the cylinder of the vessel was diminished one-half." (*Merkmale der Kriegsheilkunst*, p. 132.)

V. Cases of Incised and Punctured Wounds Fatal from Pyæmia.

CASE I.—A boy, four years of age, on the 25th of November, 1834, fell upon the blade of a penknife, which entered his neck over the seat of the great ves-

sels, just back of the thyroid cartilage. Dr. Bartlett saw him about five minutes after the accident, and found venous blood flowing in a full stream, the quantity lost, by estimation, being ten ounces. The bleeding was arrested by a moment's compression with the finger, and nothing more was done than to apply a bit of adhesive plaster. On the 29th, the neck was tender to the touch and a little swollen. The boy was restless and feverish, and he was placed upon the use of the antimonial and saline mixture, and a lotion of alcohol and water was applied to the neck. Dec. 1st. Had been leeches. At 10 A. M. had a severe chill, short, quick breathing, and frothing at the mouth; low, muttering delirium during the night; lips dry and some sordes on the teeth. Dec. 3d, 10 P. M. Death during a paroxysm of chills.

On dissection it was found that the internal jugular had been penetrated by the knife. Between the vertebrae and the sheath of the vessels an abscess had formed, containing six ounces of pus, and extending from an inch above the wound as low down as the clavicle. Coagulated blood was found in the sheath as low down as the pericardium. The wounds in the vein were closed by adhesive inflammation, and the cylinder of the vessel was so much contracted at that point, as to admit of the passage of a little more than an ordinary probe. "For the space of two inches below the wound, there was some appearance of ulceration within the vein; and it contained a firm, strong white cord of coagulum, extending from the wound into the right ventricle of the heart. This was so large as nearly to fill the jugular vein, and in many places adhered pretty firmly to it. The third or half of the pericardium next the base of the heart, showed marks of high inflammation." (*Amer. Jour. Med. Sci.*, Aug. 1835, p. 357.)

CASE II.—M. Tacheron reports the case of a woman who was stabbed with a poniard in the root of the neck. Profuse hemorrhage ensued, and a tumour of the size of an egg, formed. Symptoms of pyæmia set in, and death occurred on the fifteenth day. The autopsy disclosed an abscess behind the carotid and internal jugular, and the latter presented a round opening, two lines in diameter, in its posterior wall. At this point a yellow fibrinous clot obliterated the interior of the vessel, and the clot, which contained a puriform fluid, extended down the jugular into the right auricle, where it expanded into a rose-colored and organized coagulum. Pleurisy existed on the left side. (*Gaz. Méd.*, p. 203. 1837.)

CASE III.—Specimen 1521⁵⁵ of the Museum of Guy's Hospital, London, shows a "jugular vein, exhibiting a wound occupying about half its circumference, and situated about half an inch above the subclavian; the neighbouring branches showing effects of phlebitis."

"James F., aged 30, under Mr. Birkett. He received a stab with a knife on the left side of the neck, piercing the sterno-cleido-mastoid muscle near its origin, by which the jugular was wounded. Much hemorrhage followed and continued for several days, when symptoms of phlebitis set in, and he died of pneumonia twenty days after the accident. The vein was found wounded as here seen, its coats infiltrated with lymph, and the interior filled with fibrin; lungs filled with abscesses." (*Catalogue of the Pathological Preparations of the Museum of Guy's Hospital*. Edited by Dr. Wilks, vol. i. London, 1863.)

VI. *Cases of Wounds Fatal from Other Causes.*—In addition to the above-mentioned observations, two additional cases are recorded of wounds of the internal jugular vein, in both of which neither secondary hemorrhage nor pyæmia was the cause of death.

CASE I.—Professor Gross, on the 14th of September, 1846, was called to a lad fourteen years of age, of a serofulous constitution, who had been wounded by the accidental discharge of a fowling-piece, a portion of the load, which consisted of large squirrel shot, entering the neck at four or five different points. The wounds were attended with little hemorrhage, and the patient soon recovered from the shock. For a time everything progressed favourably; the wounds of the neck healed without any application, when suddenly, thirteen days after the

accident, and without any premonitory symptoms, the patient was seized with a protracted epileptic convulsion, chiefly affecting the left side, and died the following day without any return of consciousness.

Autopsy.—The shot which had entered the region of the right jugular and carotid, had perforated the anterior wall of the former vessel, and lodged on the inner surface of the opposite wall, where it had become completely encysted. The vein bore no evidence of inflammation; its cavity, however, was somewhat diminished by the projecting cyst; the opening in front was perfectly closed, and there was no external nor internal clot.

A shot had perforated the trachea and œsophagus, and was imbedded in the cartilage between the third and fourth cervical vertebrae. The openings were closed, with the exception of the one in the posterior wall of the œsophagus, which was separated from the spine by an abscess extending from the second to the seventh cervical vertebrae, and containing six drachms of serofulous pus. One shot had perforated the subclavian artery and lodged in the first rib. The calibre of the vessel was unimpaired, and the openings were closed by small clots extending around the outside of the vessel, upon the removal of which the margins of the wounds appeared as if they had just been inflicted. The artery presented no marks of inflammation. The brain and spinal cord were free from morbid appearances, except a little serum in the lateral ventricles of the former. (*Amer. Journ. Med. Sciences*, p. 355. April, 1848.)

CASE II.—Dr. John H. Packard narrates the case of a man twenty-six years of age, of intemperate habits, who was admitted into the Pennsylvania Hospital on the 3d of November, 1855. He had been stabbed ten hours previously just below and behind the left ear, and was covered with blood. The hemorrhage had, however, ceased, and a tumour with much ecchymosis had formed. Cold water was applied, and five days subsequently there was some bleeding from the wounds and the tumour was found to be the seat of pulsation and somewhat diminished in size. On the 10th, Dr. Norris ligated the common carotid with the effect of arresting the pulsation; and on the 19th erysipelas set in, but subsided in a week. Death ensued from softening of the brain on the 6th of December.

A post-mortem inspection showed a sac occupied by a clot of blood in front of the upper cervical vertebrae, on the inner surface of which were three openings, the largest being that of the distal extremity of the divided internal jugular vein, while the other two corresponded to the almost divided occipital artery. The vein was much contracted and perfectly occluded for about half an inch on the cardiac side of the sac, and the common carotid artery was plugged up with firm coagula. The brain was somewhat softened throughout, with effusion into the ventricles. The cerebral tissue of the superior and anterior portion of the left hemisphere and of the posterior portion of the right hemisphere was broken down into a pasty mass. (*Amer. Journ. Med. Sciences*, p. 396. April, 1856.)

REMARKS.—The foregoing twenty fatal cases present many points of interest, and demonstrate that wounds of the internal jugular vein are by no means to be considered necessarily mortal from primary hemorrhage, that issue having occurred in but twenty per cent. of the cases. In one of these death was almost instantaneous, the vein having been divided to the extent of one-half its calibre. In the second, the patient lived a little more than an hour, the wound having been oblique and gaping, and of about three lines in extent. In the third, both veins and the left carotid were wounded, resulting in instantaneous death; and in the fourth, the vein was completely divided, and the hemorrhage proved fatal in one hour.

Of the cases in which the introduction of air into the circulation was the cause of death, the first and second were fatal in one minute, the vein,

in one, having been completely divided, in the other it was opened to the extent of three lines. In the third case, the patient died in three hours and a half, the calibre of the vein having been divided one-half; and in the fourth, there was complete division with a fatal issue on the seventh day. Secondary hemorrhage, as a result of gunshot wounds, occurred in the five cases, respectively, on the fourth, eighth, tenth, and in two, fifteenth day.

Pyæmia resulted from gunshot wounds in two cases, one on the twenty-first day, the date of the other not being given. It was also the cause of death in three instances of incised wounds, on the eighth, fifteenth, and twentieth days respectively.

In the remaining two cases, the fatal issue was due, in one, to epilepsy, in the other to softening of the brain from ligation of the carotid artery.

Primary hemorrhage was prevented in the first case of Dr. Stromeyer by a splinter of bone, which had been driven into the vessel, and formed a mechanical obstacle to the flow of blood until loosened by suppuration. In the patient of Dr. Schwarz there was no external bleeding, the ball remaining at the opening of the vein, permitting the escape of but a few ounces of blood into the surrounding tissues. In Dr. Stromeyer's second case there was no hemorrhage, but had the ball been removed by incision, the patient would have been exposed to this danger as well as to the introduction of air. In the case of M. Velpeau the ball was partly in the vein, and in the absence of a satisfactory history we may presume that death resulted from secondary bleeding.

That *spontaneous union* of the lips of the wound, by the efforts of nature alone, may occur, is beautifully illustrated by the case of Professor Gross, which is rendered more interesting from the fact of the shot having become encysted in the interior of the vessel. In Dr. Schwarz's case, fatal from pyæmia, the rent in the vessel, of several lines in extent, had completely closed. At the cicatrice, the coats of the vein were thickened by plastic effusion, and a semi-organized layer of lymph was deposited on the lining membrane. The case of Dr. Bartlett showed the wounds healed, but the cavity of the vessel nearly obliterated; and the case of Dr. Stromeyer is interesting from the mode of healing, the wound, five lines long, adhering to the posterior and inner surface of the vessel, diminishing its calibre one-half.

In all these cases an abscess was present posterior to the sheath of the vessels, and in front of the cervical vertebræ.

For convenience of reference the foregoing cases are presented in the annexed table, from which it will be perceived that the causes of death were in the following ratio; introduction of air, 20 per cent.; primary hemorrhage, 20 per cent.; pyæmia, 25 per cent.; secondary hemorrhage, 25 per cent.; and other causes, 10 per cent.

TABLE I.—*Fatal Cases of Wounds of the Internal Jugular Vein.*

Case.	Surgeon.	Authority.	Cause of death.	Period of death.	Injury and extent of wound of vessel.	Vein affected.
1	Vallée,	Gaz. Méd. de Paris, p. 269. 1837	Primary hemorrhage	Instantaneous	Almost complete division; stab in neck	Right jugular.
2	Bryant,	Trans. Path. Soc. London, vol. viii. p. 101. 1857	Primary hemorrhage	1 hour and 5 minutes	One-fourth of an inch. Fall on broken china	Right jugular.
3	Gray,	Holmes System of Surgery, vol. ii. p. 277. London, 1851	Primary hemorrhage	Instantaneous	Inclined in suicide; both veins & left carotid artery	Both jugulars
4	S. Cooper,	Practice of Surgery, vol. i. p. 329. New York, 1822	Primary hemorrhage and suffocation from pressure on trachea	A little more than an hour	Complete division; gunshot wound	
5	Ulrich,	Compendium de Chir. Pratique, vol. i. p. 80. Paris, 1840	Introduction of air	1 minute	Complete division in removal of tumour	
6	Gorré,	Annal. de la Chirurgie Française et Étrangère, vol. vi. p. 305	Introduction of air	1 minute	Three lines and oblique. Removal of tumour	Left jugular.
7	Mirault,	Comp. de Chir. Pratic., vol. i. p. 80	Introduction of air	3½ hours	Half its calibre in removal of tumour	Right jugular
8	Roux,	Gaz. Médicale, 1833, p. 195	Introduction of air, coma	7 days	Complete division in removal of tumour of neck	
9	Stromeyer	Max. der Kriegsheilkunst, 2d ed., p. 131. Hannover, 1861	Secondary hemorrhage	4th day	Gunshot; splinter of bone driven into vessel.	Left jugular.
10	Langenbeck	Archiv für Klin. Chir., vol. i. p. 22. Berlin, 1860	Secondary hemorrhage	8th day	Gunshot; vein torn	Left jugular.
11	Hennen,	Princip. of Mil. Surg., Am. ed., p. 90. New York, 1830	Secondary hemorrhage	10th day	Gunshot, followed by ulceration	Left jugular.
12	Robert de Lamballe	Plates d'Armes à Feu, p. 159. Paris, 1833	Secondary hemorrhage	15th day	Gunshot, involving common carotid artery	Right jugular
13	Velpeau,	Operative Surg., Am. ed., vol. i. p. 80. New York, 1858	Secondary hemorrhage	15th day	Gunshot, involving common carotid	
14	Schwarz,	Archiv für Klin. Chir., vol. i. p. 23	Pyæmia	....	Gunshot	Wound of vein had united.
15	Stromeyer,	Maxim. der Kriegsheilkunst, p. 132. Hannover, 1861	Pyæmia	21st day	Gunshot, five lines	Left jugular, wound united
16	Bartlett,	Am. Jour. Med. Sci., vol. xvi. p. 357. 1835	Pyæmia	8th day	Punctured by pen-knife	Wound united.
17	Tacheron,	Gaz. Médicale, 1837, p. 203.	Pyæmia	15th day	Stab with poniard; two lines	Wound open.
18	Birkett,	Catalogue of the Pathological Preparations of the Museum of Guy's Hospital, vol. i. London, 1863	Pyæmia	20th day	Stab with a knife; half of circumference	Left jugular, wound open.
19	Gross,	Amer. Jour. Med. Sci., April, 1848, p. 355	Epilepsy	14th day	Punctured by small shot	Right jugular, wound united
20	Packard,	Amer. Jour. Med. Sci., April, 1856, p. 396	Softening of the brain	33d day	Stab, involving occipital artery	Left jugular, wound open.

Arterio-Venous Aneurism of the Internal Jugular Vein.—Wounds of the internal jugular vein, when complicated with similar injuries of the carotid artery, do not always prove fatal, either at once or secondarily, but may result, under favourable circumstances, in the formation of arterio-venous aneurisms. The prognosis of these cases is less serious than when the artery alone has been injured, as a portion of the blood of the latter penetrates the vein; a tumor composed of effused blood forms in the surrounding tissues, and the hemorrhage is arrested, and the cure effected by the

almost unaided efforts of nature. I have been able to collect nine examples of this affection, seven being referable to aneurismal varix, and two to varicose aneurism. In five the communication existed between the primitive carotid artery and internal jugular vein, and in four between the latter and the internal carotid. In none did the affection appear to shorten life, or produce much inconvenience. In the cases of Baron Larrey—the first on record—as well as in the one narrated by Dr. Marx, the formation of the aneurismal varix was favoured by the mode of production of the wound; they were the result of sword thrusts which divided the sterno-cleido-mastoid muscle in the direction of its fibres, so that when the weapon was withdrawn, the wounds did not gap. In all the cases syncope from loss of blood, by favouring the coagulation of that fluid, materially added to the fortunate issue.

CASE I.—A sub-officer, on the 23d of September, 1821, was wounded by a short sword immediately above the sterno-clavicular articulation. The sternal origin of the sterno-cleido-mastoid muscle had been cut in a longitudinal direction, to the extent of half an inch, and the right internal jugular vein and primitive carotid artery, near its origin from the innominate, had been punctured. A very copious hemorrhage ensued, and the surgeon of the corps with difficulty arrested it.

The patient was brought to the hospital and the dressings were carefully removed. Baron Larrey found the edges of the wound agglutinated by a black coagulum, and a pulsating tumour had formed, of the size of the fist, accompanied with a peculiar bruit. The man was speechless, weak, and pale, and in a state of stupor. The wound was dressed with adhesive strips, and covered with a bladder filled with ice.

In the evening the pulse and warmth of surface had returned; the external jugular vein pulsated and was much enlarged; and the man was bled from the arm. On the fifth day the pulse was very frequent, and there was intense cephalalgia, for which the temporal artery was opened, and leeches applied to the nucha and between the shoulders. On the tenth day the tumour began to diminish, and had disappeared on the sixtieth day after the accident, when he returned to duty. The varix, however, remained. The treatment consisted in repeated withdrawals of blood by opening a vein and by leeches, in the continuous application of ice to the tumour, and the exhibition of cooling drinks. (*Clinique Chirurgicale*, vol. iii. p. 149. Paris, 1829.)

CASE II.—This case was analogous to the preceding. The man entered the hospital, April 5th, 1822, to be treated for a small wound on the lower portion of the right side of the neck, accompanied with an ovoidal tumour of an aneurismal nature. Both resulted from simultaneous perforation of the walls of the jugular vein and the carotid artery, produced by a sabre thrust. The symptoms were not so well marked as in the preceding case, on account of the arterial lesion being smaller. The treatment was precisely similar, and the man returned to duty at the expiration of two months. (*Ibid.*, p. 154.)

CASE III.—A gentleman was wounded in a duel, the point of the sword entering above the inner end of the right clavicle, and inflicting a wound half an inch long. Arterial blood escaped in a full and continuous jet, which the patient himself arrested by placing several folded handkerchiefs over the cut and retaining them in position by another carried around the neck. He walked to a hospital in the vicinity, which required thirty minutes; but on his way, feeling weak, he stopped at a tavern to take a glass of wine, where he fell into a state of partial syncope. When he arrived at the hospital, the surgeon brought the edges of the wound together with adhesive strips, and placed him on a rigorous

diet. At the expiration of five days the wound had united, and the patient returned home, with a small pulsating tumour, attended with a bruit. It gradually disappeared and gave him no inconvenience.

Twenty years after the accident, Dr. Marx presented the man to the Academy of Medicine, when he had all the signs of an aneurismal varix. (*Mémoires sur l'Aneurysmes*. Par M. Breschet. *Mémoires de l'Académie Royale de Médecine*, vol. iii. p. 233. Paris, 1833.)

CASES IV.-V.—Two other cases of traumatic aneurismal varix of the common carotid and internal jugular vein are recorded: one by Williamson,¹ the result of a sabre wound above the clavicle; the other by Rigaud,² the lesion having been produced by a very fine splinter of glass.

CASES VI.-IX.—MM. Joret, Desperanches, A. Bérard, and Giralès have each observed a case of arterio-venous aneurism between the internal jugular vein and common carotid artery; and in two of the cases in which an autopsy was held, an aneurismal sac existed between the vessels. The wound was produced in two cases by a ball, in one by a particle of lead, and in the fourth by a shoemaker's knife. In the case of M. Giralès the projectile was found in the aneurismal sac.³

In the next number of this journal the subject of this paper will be completed, by some observations on the treatment of wounds of the internal jugular vein for the arrest of hemorrhage, and the prevention of the introduction of air.

PHILADELPHIA, October, 1866.

ART. II.—*On Internal Aneurism, and its Relation to Sudden Death, with an account of ten cases in which the existence of that disease was not suspected prior to the death of the subject, from rupture of the sac; to which is appended a Practical Discussion concerning the Diagnosis and Treatment of Aortic Aneurism.* By JOHN A. LIDELL, M. D., of New York.

IN the time of our predecessors, when a person in full flesh, and seemingly free from disease of any serious nature, happened to fall down suddenly, without apparent cause, and immediately expire, it was usually said that the death was occasioned either by *apoplexy*, or by *disease of the heart*. Indeed, the term apoplexy had its origin far back in Grecian antiquity, in one of the most striking of the circumstances mentioned above; for the victims of that disease generally fall down suddenly, as if stricken by a powerful blow. But pathological investigations of an anatomical character, especially those of a recent date, have abundantly shown that there are other causes of sudden death, unconnected with wound, or violence, or poison, besides the anatomical lesions of the brain and heart, and that

¹ Sabatier par Duquytren. De la Méd. Oper., vol. iii. p. 188. Paris, 1832.

² Follin. Traité Elementaire de Path. Ext., vol. ii. p. 411. Paris, 1863.

³ Ibid., p. 413.

among these additional causes of sudden death internal aneurism stands very prominent, on account of the frequency with which it produces such a result, through rupture of the aneurismal sac, and extravasation of blood therefrom.

The term internal aneurism is employed as an antithesis to that of external or surgical aneurism. This disease is called surgical, when it is located in the extremities, or in any other part of the body, permitting the employment of surgical treatment for its relief; for example, the neck, axillary, and inguinal regions. But it is called internal aneurism when it is located deep within the body, and generally in such parts thereof as do not allow the employment of surgical treatment; such, for example, as the cavities of the thorax, abdomen, and cranium. When this affection is developed within the thorax, it proceeds from either the aorta, or from the great vessels which are given off from the arch of the aorta, namely, the innominate, the left carotid, and left subclavian (before the two arteries last named have emerged from the thorax, of course), or from the pulmonary artery—generally a branch thereof—or, in very rare instances, from one of the coronary arteries of the heart. When this disease is situated within the abdomen, it involves either the aorta or its branches, such as the celiac axis, the hepatic and splenic, the superior mesenteric, and the renal arteries, or the primitive iliaes. Aneurisms of the external and internal iliaes are generally considered as external, because they are amenable to surgical or operative treatment. Finally, aneurism occurring within the remaining one of the great cavities of the body, the cranium, has occasionally been met with, being developed from either the basilar or the internal carotid, or one of the cerebral arteries.

The aorta, however, is the seat of internal aneurism in a large majority of all the cases in which that form of the disease occurs. Aneurisms of the pulmonary, coronary, hepatic, splenic, mesenteric, renal, basilar, and cerebral arteries, are affections that appear but very rarely (at least I have seen but one instance in more than 2000 autopsies), and aneurisms of the innominate, the left carotid, and left subclavian arteries within the thorax, and the primitive iliaes are—excepting the innominate—not often met with. In 551 cases of aneurism tabulated by Dr. Crisp, the arteria innominate was the seat of the disease in 20 instances, the common iliac in but 2, the pulmonary artery in but 2, the arteries of the brain in 7, while the abdominal aorta and its branches were involved 59, and the thoracic aorta 175 times. (*Crisp on Diseases of the Bloodvessels*, pp. 113 and 127.) It is also probable, for reasons which will be stated in the sequel, that the relative frequency with which aneurism of the thoracic aorta occurs is not fairly represented by Crisp's table, and that, in reality, this disease has its seat in that portion of the arterial system much oftener than said table would lead us to suppose.

But not all parts of the thoracic aorta are equally exposed to the occur-

rence of aneurism. It is developed most frequently in the ascending portion of that vessel. It is met with next in point of frequency in the transverse part of the arch; and, in general, proceeding beyond the arch, the more distant from the heart any portion of the aorta is, the less also is its liability to become affected by aneurism. There are several reasons, however, why this disease is developed much more frequently in the ascending and transverse portions of the aortic arch than in any other part of the arterial system. 1. The ascending portion of the aorta is embraced within the pericardial cavity, and is directly covered or invested only by a thin serous membrane, continued on to it from the heart, and not by a tough fibrous sheath, such as belongs to arteries in other situations. The walls of the ascending portion of the aortic arch, being thus not supported or strengthened by the presence of a sheath, are peculiarly liable to give way and become the seat of aneurism.

2. The impulse of the blood produced by contraction of the left ventricle of the heart acts more powerfully upon the arterial tunics in the portions of the aorta which are near to the great central organ of the circulation than in the parts which are remote from it; and, speaking generally, we may say that the degree of outward pressure exerted upon the walls of the aorta by the contractions of the left ventricle of the heart diminishes as the distance from that organ increases.

3. The transverse portion of the aortic arch is particularly exposed to the occurrence of aneurism, because the current of the blood, as it is forced through the vessels by the contractions of the heart, sets strongly against the distal side, or the convexity, of the curvature of that arch. The impulse of the blood is therefore felt more strongly in the upper and posterior portion of the aortic arch than elsewhere, and thus a special tendency is established for the formation of aneurisms in that situation.

Aneurismal tumours developed from the ascending aorta attain a large size in but a small proportion of the cases, and generally terminate in sudden death from rupture of the sac and extravasation of blood into the cavity of the pericardium. The walls of such aneurisms are liable to give way at an early period in the history of the disease, because they are not strengthened by the coalescence with them of any arterial sheath, or any considerable planes of connective tissue. The rent in the walls of such aneurisms generally, or, indeed, almost always, takes place into the pericardial cavity, because the ascending portion of the aortic arch lies within that cavity, the fibrous layer of the pericardium uniting itself with the aorta at the commencement of the transverse portion of the arch, and becoming continuous with its sheath and external coat at that point. Six cases, in each of which an aneurism of the ascending aorta burst into the cavity of the pericardium will be narrated in the sequel. Such subjects always die instantaneously, or nearly so, and are generally supposed to perish from disease of the heart, unless the real cause of death is ascertained

by making an autopsy. The victims of this variety of aortic aneurism are, for the most part, met with, not among the inmates of our general hospitals, but among those who, while engaged in their daily avocations, suddenly fall down and immediately expire, or are unexpectedly found lying dead in their workshops and other places of business. They have generally been supposed to be in the enjoyment of a fair degree of health up to the time of their sudden demise, although they not unfrequently complain of pain and oppression in the chest, and of other symptoms produced by their disease which are usually referred to anything but the real cause. Such cases come under the administration of the coroners in this city, and are not likely to attract the surgeon's attention, unless he is specially engaged in ascertaining the causes of sudden death occurring among persons apparently in usual health. The pathological anatomist who forms his opinion with regard to the relative frequency of the occurrence of aneurism in the ascending portion of the aorta, solely from what he has seen in the dead-house of a general hospital, will greatly err, because the victims of that form of the disease comparatively seldom enter any hospital. Furthermore, I am convinced from personal observation and experience that no inconsiderable share of the cases that die suddenly without medical attendance and without any obvious cause, such as violence, poison, intemperance, etc., would constitute, and wherein—no autopsy being made—the death is supposed to have been produced either by apoplexy or by disease of the heart, die in reality from an unsuspected aneurism of the aorta, and that, in a considerable majority of these cases, the aneurism is located in the ascending portion of the aortic arch. For example, in *ten* cases belonging to this category that have come under my own notice, and wherein autopsies were held (in nine of them the post-mortem examination was made by myself, and in the remaining instance the pathological specimen was shown to me directly after its removal from the subject), the aneurism was found to be located in the ascending portion of the aortic arch in *eight* instances, in the thoracic aorta in *one* instance, and in the abdominal aorta in the remaining instance. Of these ten cases of aortic aneurism in which death occurred suddenly and unexpectedly to all concerned, the history of nine, or those whereof I made the autopsy, will also be narrated in this essay.

With regard to the relative frequency with which aneurism occurs in the different portions of the aorta contained within the cavity of the chest, a careful analysis of Dr. Crisp's table, containing five hundred and fifty-one cases of spontaneous aneurism, yields the following results: The aorta above the diaphragm, that is, the portion of said vessel embraced between its origin at the left ventricle of the heart and the point where it passes through the aortic opening of the diaphragm, was the seat of aneurism in one hundred and seventy-five cases. Of them the disease was located in the ascending portion of the aorta in ninety-five instances; in the "aortic

arch" (by which term, I suppose, what is properly called the transverse part of the arch is meant) in forty-seven instances; and in the "descending thoracic" in thirty-three instances. From this, it appears that aneurism occurs about twice as often in the ascending as it does in the transverse portion of the aortic arch, and about three times more frequently in the ascending portion of the aorta than it does in all the "descending thoracic." By this term "descending thoracic" I suppose the descending portion of the aortic arch is embraced as well as the thoracic aorta, properly so called. In an appendix, dated 1851, Dr. Crisp gives sixty-seven additional cases of thoracic aneurism. Of these, thirty-six involved the ascending aorta (including six cases wherein the arch was also implicated), twenty-one were developed from the transverse portion of the aortic arch, and ten from the "descending thoracic." Adding these cases to the foregoing gives a total of two hundred and forty-two cases of aneurism developed from the aorta, within the cavity of the thorax, and distributed as follows: In one hundred and thirty-one instances the aneurismal tumour occurred in the ascending aorta; in sixty eight, in the transverse portion of the aortic arch; and in forty-three, in the descending thoracic. There appear to be serious typographical errors in some of the statements which Dr. Crisp has made concerning the general statistics of thoracic aneurism. (*Op. cit.*, p. 389.) Thus $175 \text{ (p. 127)} + 67 \text{ (p. 388)} = 242$, instead of 241 cases in all of thoracic aneurism, as stated on page 389. Again, the quantities $134 + 69 + 31$ (given also on p. 389), = 234, and not 241 or 242. We have, therefore, considered the figures in the paragraph on general statistics on page 389 as erroneous, and have made the necessary corrections of them. We have succeeded in doing this by analyzing, first, the general table containing 551 cases of spontaneous aneurism, and extracting therefrom the 175 cases of that disease involving the aorta above the diaphragm, then ascertaining in how many of them the disease was located in the ascending aorta, the transverse portion of the arch, and in the descending thoracic respectively, and adding thereto the details of the information on the subject of thoracic aneurism contained in the appendix. In this way we obtain a total of 242 cases of aneurism of the aorta occurring in the thorax and developed from the several anatomical divisions of that vessel above the diaphragm in substantially the same proportions as already pointed out, namely, about twice more frequently in the ascending aorta than in the transverse portion of the arch, and about three times oftener in said ascending aorta than in the whole of the descending thoracic.

But it should be borne in mind, while we are making these deductions from the statistics collected by Dr. Crisp, that all, or nearly all, of said cases of aortic aneurism occurred in either hospital or private practice, and that, if we were able to add to them the cases of this form of disease which occur in neither hospital nor private practice, cases which die suddenly while engaged in the ordinary avocations of life, without any professional

attendance whatever, or, at least, without any steady attendance, and without the real cause of death becoming known until perchance an autopsy is held, we should probably find that aneurism occurs in the ascending portion of the aortic arch with much greater relative frequency than is indicated by the study of Dr. Crisp's table, the general results of which have been given in the preceding paragraphs. The question which is here raised will, judging from the rapid progress now being made in pathological science, probably be definitely settled before the lapse of many years.

Again, a question of much importance, in a practical point of view, is that which concerns the development of aortic aneurism in its relation to population, and especially to numbers. How often does that disease occur in a given population? For reasons already stated we are not prepared to furnish a satisfactory answer to that question at the present time. We can, however, safely say that although this disease does not occur very often, it does in reality occur much more frequently than has generally been supposed, and that it is not by any means a rare affection. Upon this point the record of deaths, with the causes thereof, occurring in the city of New York for several years past, affords valuable information, notwithstanding the record is obviously incomplete. On examining the City Inspector's reports for a series of years, we find that during a period of nine years (from 1856 to 1864 inclusive), no less than two hundred and forty-three interments of subjects, whereof aneurism was recognized as the cause of death, were registered in his office. In how many additional instances, during this period, death was, in reality, produced by internal aneurism, although reported as occasioned by some other cause, such as "rupture of a bloodvessel," "hemorrhage," "disease of the heart," "angina pectoris," and "apoplexy," must be left to conjecture. But, at the same time, I am thoroughly convinced that the number of such instances is not small. However, the figures mentioned above yield an average of twenty-seven deaths per annum, for a period of nine years, in which aneurism was recognized as the cause of disease. The City Inspector's reports further show that of these two hundred and forty-three fatal cases of aneurism, one hundred and forty-eight were instances of aortic aneurism, eighteen of cardiac aneurism, and that in seventy-seven instances the artery involved in the disease is not stated. Now, when we reflect that external aneurisms do not, as a general thing, prove fatal, but are, for the most part, cured by surgical treatment, we are justified in considering that, at least, a very large majority of the seventy-seven instances in which the diseased artery is not named in the above-mentioned reports, were instances of internal aneurism, and when we reflect further how seldom any other form of internal aneurism occurs in comparison with that of the aorta, we are led to believe it probable that in a considerable majority of these seventy-seven cases the aneurismal disease was also located in the aorta.

The following table, which the writer has carefully compiled from the annual reports of the City Inspector, exhibits, at a glance, the number of deaths from aneurism, which were returned to that officer, during each year from 1856 to 1864 inclusive, together with an approximate statement of the varieties thereof, and the ages of the subjects.

Tabular Statement of the Deaths from Aneurism reported by the City Inspector of New York, during a period of Nine Years, ending with 1864.

		From												Total.		
		2 to 5 yrs.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.			
1856.	Aneurism . . .	...	...	...	...	...	...	1	3	...	2	...	...	6		
	do of aorta	...	1	...	...	...	1	2	4	2	...	...	...	10		
	do of heart	...	...	...	...	...	1	1	...	...	...	1	...	3		
														—	19.	1856.
1857.	Aneurism . . .	...	...	...	...	...	2	2	2	...	...	1	...	7		
	do of aorta	...	...	...	...	...	2	6	3	1	...	1	...	13		
	do of heart	...	...	...	...	...	...	...	1	2	2	...	...	5		
														—	25.	1857.
1858.	Aneurism . . .	...	...	1	...	1	3	2	...	...	...	...	1	8		
	do of aorta	...	...	...	...	2	4	4	1	1	3	1	...	21		
	do of heart	...	...	...	1	1	1	...	...	1	...	...	...	4		
														—	35.	1858.
1859.	Aneurism . . .	...	1	...	...	...	4	1	2	...	...	...	...	8		
	do of aorta	...	...	...	...	...	6	6	...	1	...	...	...	13		
														—	21.	1859.
1860.	Aneurism . . .	1	...	...	...	2	5	...	2	3	...	1	...	14		
	do of aorta	...	...	...	1	3	2	4	...	...	...	...	...	10		
	do of heart	...	...	...	...	...	1	...	...	...	...	...	...	1		
														—	25.	1860.
1861.	Aneurism . . .	...	1	...	...	2	5	1	...	1	...	...	...	10		
	do of aorta	...	...	1	1	1	12	6	3	1	...	...	...	25		
														—	35.	1861.
1862.	Aneurism . . .	...	...	1	...	2	3	3	...	1	1	...	...	11		
	do of aorta	...	...	...	2	...	1	7	4	3	2	1	...	20		
	do of heart	...	...	...	...	...	...	...	1	1	...	...	...	2		
														—	33.	1862.
1863.	Aneurism . . .	...	...	...	...	1	1	3	2	...	...	...	...	7		
	do of aorta	...	...	...	...	...	6	8	2	...	...	...	...	16		
	do of heart	...	...	...	...	...	1	...	...	1	...	...	...	2		
														—	25.	1863.
1864.	Aneurism . . .	...	...	...	...	2	2	1	1	...	...	...	...	6		
	do of aorta	...	...	1	1	6	5	2	...	...	...	...	...	15		
	do of heart	...	...	1	...	...	...	...	...	...	...	...	...	1		
														—	22.	1864.
Total . . .		1	1	2	6	6	25	81	69	24	20	6	2	243.		

With regard to the age at which death occurs from aneurism, the analysis of the above table shows that during the period of nine years there died of aneurism in New York city 1 between the age of 2 and 5 years, 1 be-

tween 5 and 10, 2 between 10 and 15, 6 between 15 and 20, 6 between 20 and 25, 25 between 25 and 30, 81 between 30 and 40, 69 between 40 and 50, 24 between 50 and 60, 20 between 60 and 70, 6 between 70 and 80, 2 between 80 and 90. *Total* 243. From these statistics it appears that the decade embraced between the age of 30 and 40 is much more exposed to the occurrence of aneurism than any other period of life of the same duration, since 81, or exactly one-third of the whole number, died during that decade. Next to this, in respect to fatality from aneurism, stands the decade between 40 and 50, during which period 69 died, or rather more than one-fourth of the whole number. During the period of ten years, embraced between the age of 20 and 30, no less than 31, or about one-eighth of the whole number, are reported as destroyed by aneurism. Only about one-tenth of the deaths occurred between the age of 50 and 60, and one-twelfth between 60 and 70. Of the the whole number of deaths 219 occurred between the ages of 25 and 70, and it is a circumstance not without palpable meaning that of these 219 deaths 175, or more than three-fourths, happened between the ages of 25 and 50, a period which is well known to be the most active and laborious of any during life.

The yearly average of deaths from aneurism that are reported as such in New York is 27.

The largest number of deaths from aneurism reported in any one year was 38, and the smallest 19. The former occurred in 1858, and the latter in 1856. I cannot help thinking that the proportion of aneurism of the heart exhibited by the foregoing table is very large, being something over one-fourteenth of the whole number, and that cases of aneurism of the ascending aorta which have burst into the right auricle or ventricle, and perhaps other instances, may have been classified as aneurism of the heart.

With regard to sex, the City Inspector's reports show that of the 243 deaths from aneurism, 200 subjects, or something over four-fifths of the whole, were males, and but 43 females.

With regard to the nationality of those who died of aneurism, 81, or exactly one-third of the whole number, were natives of the United States; 161 were foreign born, and in one instance the nativity was unknown. From this it appears that emigrants are much more liable to become affected with this disease than our native population. Of the 81 deaths from aneurism occurring in persons born in the United States, 9 were subjects of African descent (coloured), which shows that the negro is not exempt from this disease.

Of the 10 cases which will be narrated in this essay, 1 was between 15 and 20 years of age, 1 between 20 and 25, 1 between 30 and 40, 6 between 40 and 50, and 1 between 50 and 60. The youngest was 16, and the oldest 50+. All of them were males.

In respect to nativity, 4 of them appear to have been born in this

country and 6 in Europe. Of the latter, 5 were natives of Ireland, and 1 of Germany.

In respect to colour, 9 were white and one was a negro.

With regard to occupation, 3 of them were labourers, 1 a cartman, 1 a soldier, 1 a baker, 1 a confectionery-maker, 2 were merchants, and the remaining 1 was a mere lad without employment. It will thus be seen that most of them followed occupations that were laborious and often required considerable and occasionally great muscular exertion.

CASE I. Aneurism developed in a branch of the pulmonary artery: sudden death from rupture of the sac and hemorrhage: autopsy: miliary tuberculosis, etc.—Robert Frost, a young lad of 16, a native of Ireland, was admitted to Ward No. 2, N. of the Emigrants' State Hospital (care of Dr. Wendel), November 29, 1849. He stated that he had suffered from an attack of hæmoptysis three weeks previous to admission, and that his expectoration had been tinged with blood for the last two or three days. At time of admission he was pale and anæmic, but in good flesh. The bloody expectoration continued one day after admission and then ceased entirely. He seemed to be improving rapidly till December 12th. On the morning of that day he complained of having cough and a sense of tightness in his chest. However, these symptoms were not sufficiently prominent to attract much attention. His playfellows report that he and they had some liquor in the afternoon, but whether they drank any of it is not stated. About 6 o'clock P. M., of the same day, while getting into bed and being apparently as well as usual, he suddenly began to vomit blood. He vomited three times in all—a chamberful each time, the nurse stated. The first two vomits consisted of red blood, the last was dark. In three minutes after the vomiting began he was moribund.

Autopsy twenty-two hours after death.—Cadaver very pale and waxy. Sanguillations very slight. Embonpoint preserved. Frothy sanguineous fluid oozing from mouth. Left lung contains but very little blood. It is extensively infiltrated with miliary tubercles. Its bronchial tubes contain a considerable quantity of frothy bloody fluid. Right lung strongly adherent to parietes of chest throughout. It is also extensively infiltrated with miliary tubercles. Its lower lobe is for the most part solidified by tubercular pneumonia. Its bronchial tubes are filled with frothy bloody fluid. Occupying the central and superior portion of the inferior lobe of the right lung there is a smooth and well-rounded cavity, larger (considerably) than a hen's egg, and filled with blood. A bronchial tube of considerable size opens into this cavity—other and smaller ones probably do also. The walls of the cavity are smooth, firm, and composed of cellular tissue condensed by pressure. Some blood is infiltrated into the pulmonary tissue lying around or adjoining the walls of the cavity. Situated on one side and just within this cavity *there is a small aneurism developed from a branch of the pulmonary artery*. This vessel, where it enters the aneurism, is between two and three lines in diameter. The aneurism, where most dilated, is nearly six lines in width. Its sac has been ruptured and the blood has escaped into the pulmonary cavity described above. Said cavity contained a coagulum larger than a hickory-nut.

The *stomach* contains between a pint and a quart of liquid, which consists of blood blackened by the action of the gastric juice, and mixed with food in process of digestion. The *duodenum* also contains a small quantity of a similar liquid.

I witnessed the autopsy and entered substantially this account of the case in my note-book at the time. Dr. Tellkamp, who was then Physician-in-Chief of the hospital, also attended the autopsy.

Comments.—This subject died of hemorrhage. The unwonted pallor and the waxy appearance of the cadaver, together with the absence or greatly diminished quantity of suggillation in the depending portions thereof, indicated a highly anæmic condition which had been produced by excessive loss of blood, and would have assured us, without opening the body, that death had been occasioned by hemorrhage, even if the clinical history of the patient had been less clear upon this point. On completing the autopsy it was found that the fatal outflow of blood had taken place, not only from the ruptured aneurism of the pulmonary artery, but also from the gastric mucous membrane. The patient had not only had *hæmoptysis*, but also *hæmatemesis*, and these two forms of hemorrhage combined destroyed his life in a few minutes. There was no solution of the continuity of the gastric mucous membrane visible to the unaided eye. Lacerations of a microscopic character were, however, in all probability, present, since the blood had been poured out (extravasated) with great rapidity, and in great quantity, from the mucous membrane of the stomach, as was proved by the fact that very copious vomiting of blood occurred during life, and after death the stomach was found to be filled with that liquid. With regard to the cause of this hemorrhage from the gastric mucous membrane we can only say that, with our present knowledge of the subject, we are unable to assign even a plausible one for its occurrence. Was it connected with the drinking of ardent spirits in the afternoon, or with leukæmic changes in the composition of the blood, or with stagnation of the blood in the gastric veins analogous to what occurs in those cases of parenchymatous hemorrhage (so-called), which are not unfrequently met with in surgical practice? These questions are deeply interesting to both the student of pathology and the practitioner of our art, but to none of them are we able to give a decided answer. Fatal hemorrhage from the gastric mucous membrane occurs so seldom as to afford but rare or infrequent opportunities for investigating this form of bleeding, and hence the stock of our positive knowledge on this subject is very limited.

With regard to the cavity in the right lung which was found in connection with the aneurism of the pulmonary artery, it is probable that it had been produced mainly by the rupture of the sac of the aneurism and the extravasation of blood therefrom into the pulmonary tissue, which had previously been condensed (more or less) by tubercular inflammation. The extravasated blood, through the impulse imparted to it by the contraction of the right ventricle of the heart, pushed gradually before it the pulmonary tissue, and thus the cavity continued to increase progressively in size until one or more of the air-passages was opened by ulceration (perhaps), and the blood was permitted to flow away through these new channels. It was

from this source that the bronchial tubes became filled with bloody fluid. It is worth while to remark, also, that in this case the lungs were extensively infiltrated with miliary tubercles, since it has been thought by some that the tubercular dyscrasia is incompatible with the development of aneurism.

So far as I know there are but two other cases of aneurism of the pulmonary artery on record. Both of them are referred to in Dr. Crisp's table (vide *op. cit.*, p. 245 and p. 257). One of them appears to have been attended by Dr. Peacock, and the other by Mr. Fearn. Both of them had hæmoptysis, and died in consequence thereof. In both of them the aneurism was developed, not from the trunk of the pulmonary artery, but from one of its branches. It will be recollected that, in the case just related, the aneurism was also developed from one of the branches of the pulmonary artery.

CASE II. *Aneurism of ascending aorta; sudden death from rupture of sac and extravasation of blood into pericardium; autopsy.*—John Descher, æt. 45, a German, by occupation a confectionery-maker, was found, on the evening of March 14th, at 8 o'clock, lying dead on the floor of the basement in his house. It appears that he had complained of having pain in his chest and left shoulder for a considerable length of time, and that the pains got worse during the last two weeks of his life. He was supposed to be affected with chronic rheumatism, and the real nature of his disease was not suspected; at least, I was informed to that effect by the members of his family when I examined the body after death.

Autopsy twenty hours post-mortem.—Rigor mortis strong; expression of countenance that of heart disease. The pericardium contains about ten ounces of blood, the coagulated portion of which is rather more than six ounces in volume, and lies in front of the heart, covering it as a shield. This blood had escaped from an aneurism of the ascending aorta which had burst into the pericardial sac. The aneurism is pouch-shaped and communicates with the aorta by an opening or hole in the thickened internal and middle coats of that vessel, having a diameter of about three-fourths of an inch, and a margin well rounded off. The aneurism has been formed by the giving way of the internal and middle arterial tunics, or at least by a solution of their continuity, and by the progressive dilatation of the external coat. The interior of the aorta exhibits abundant atheromatous deposits throughout its ascending portion—less elsewhere. The heart is fatty, and its muscular tissue is soft and flabby. The mitral valve is somewhat thickened by deposit of atheromatous material in its laminae; aortic valves natural. The inferior surface of the left lung was firmly glued to the diaphragm by old adhesions of an inflammatory origin. Both lungs contained more than the normal quantity of blood, thereby exhibiting passive congestion, but in other respects were sound.

Comments.—The immediate cause of death in this case was the arrest of the movements of the heart, which was effected by the pressure exerted upon that organ by the blood that was extravasated into the cavity of the pericardium from the ruptured aneurism. The aneurismal sac suddenly burst open, and blood from the aorta was then quickly forced through the

fissure in such quantity as to fill up the pericardial sac to distension, and to press upon the exterior of the heart from all sides to such extent as to render its diastole impossible. Thus, all the movements of the heart were suddenly and completely arrested. The great central organ of the circulation was literally drowned in its own blood.

Now, it is not necessary that any large or even very considerable quantity of blood should be thrown into the pericardial sac, more especially if the extravasation occurs suddenly, in order to secure a complete cessation of the heart's movements, and the immediate death of the subject. The extravasation of from eight to sixteen ounces of that liquid into the heart-case will generally accomplish such a result without delay. By referring to the report of the autopsy of this case we find that a sudden effusion of but ten ounces of blood into the cavity of the pericardium sufficed to compress the heart, and cause immediate death. There was an internal hemorrhage, but the quantity of blood effused was less than that usually abstracted by an ordinary venesection. The subject did not die from absolute loss of blood, but because the hemorrhage occurred in such a locality as to compress and paralyze one of the organs whose activity is essential to the continuance of life. Hence, it happened that in this case the cadaver did not present the blanched, waxy, and exsanguined appearance which is generally present when death has been produced by hemorrhage. Hence it was that the countenance of the dead in this case wore the expression of heart disease. Hence it came to pass that no one, not even an expert, who should perchance have founded his opinion with regard to the cause of death upon the external appearance of the body alone, would have believed that a fatal hemorrhage had occurred within the thorax, and that an important aneurism had been ruptured. If I had not held an autopsy in this case, I should certainly have supposed that death had been occasioned by disease of the heart; and the subjects belonging to this class generally have their sudden deaths attributed to heart disease, unless, perchance, a *post-mortem* examination is made, and in that way the real cause of death is ascertained.

The aneurismal tumour in this case was small in size, distinctly pouch-shaped, and communicated with the interior of the artery by a comparatively narrow orifice. The aneurismal sac was formed by a dilatation, not of all of the arterial tunics, but of the external coat alone, and hence it belonged to the variety called false. The internal and middle coats of the artery had given way before the outward pressure of the blood, and sustained a solution of their continuity thereby. Thus, the external coat was made to bulge at first, and afterwards the dilatation continued to increase through the impulse which was communicated without cessation to the blood contained within the sinus formed by the dilatation of said external coat of the aorta ascendens, by the contractions of the left ventricle of the heart. Thus, the aneurismal tumour continued to get larger, and the

walls of the sac to grow thinner, until finally they gave way, and a torrent of blood was poured into the pericardial sac, which immediately destroyed the victim's life in a way that has already been pointed out, and discussed at sufficient length. The internal and middle coats of the vessel gave way in the first instance, either because they were very much weakened by the process of *atheromasia*, or because they were perforated by an *atheromatous ulcer*, or from the operation of both varieties of the atheromatous process combined. At the autopsy it was found that the interior of the aorta exhibited abundant deposits of atheroma throughout the ascending portion of the arch; less elsewhere.

The fatty condition of the heart and the soft and flabby condition of its muscular tissue assisted in prolonging the victim's life in this instance. They diminished the force of the heart's contraction, and thus weakened the impulse of the blood within the aneurismal sac, and postponed the day of rupture.

The development of the aneurism in this case was attended with the production of certain subjective phenomena in the shape of pains in the chest and left shoulder which got worse as the hour for the sac to burst drew near. These pains were supposed to be rheumatic in character until the cause of death was ascertained by making an autopsy. It is possible that if these and other symptoms had been rigidly scrutinized during life, the existence of a thoracic aneurism would, at least, have been suspected.

CASE III. *Aneurism of ascending aorta: sudden death from rupture of sac, and extravasation of blood into pericardium: autopsy.*—Nov. 1st. At the 19th Ward Station House I made a *post-mortem* examination of the body of a coloured man, named Cambridge Ritter, æt. 45, who had died very suddenly a few hours previously. The deceased was a hard-working and industrious man, of good habits. He had never complained of having any sickness or distress, so far as I could learn. He suddenly fell down while engaged in his usual avocations, and almost immediately expired.

Rigor mortis strong. Muscular system well developed. The left pleural cavity contains some bloody serum (*post-mortem* exudation). The pleura itself exhibits no abnormality. The lungs are congested (passively). The pericardium is distended with coagulated blood; it contains *ten or twelve* ounces. The heart is moderately hypertrophied. The mitral valve is considerably thickened. The aortic valves also are thickened. Just outside of these valves, that is, at the commencement of the aorta, there is a pouch-shaped aneurism of that vessel about the size of a lime. It is situated on the anterior and right side of the vessel. It has been formed by dilatation of all the arterial coats. It has been burst open. The rupture is about one-third of an inch long, and the blood has flowed through it into the pericardium. The interior of the ascending aorta exhibits patches of atheroma.

Comments.—The death of this man was produced in precisely the same way as we have already seen that death was produced in the preceding case. The sac of small aneurism, developed from the descending portion of the

aortic arch, became ruptured, a quantity of blood was suddenly poured into the cavity of the pericardium through the fissure, the pericardial bag was immediately filled to distension, the heart was compressed, and all its movements immediately arrested. About ten or twelve ounces of blood only were effused. This quantity sufficed to distend the heart-case and produce a fatal result almost instantaneously.

The aneurismal tumour was pouch-shaped, about the size of a lime, and projected from the front and right-hand side of the aorta. Its sac was formed by a dilatation of all the arterial tunics, or, in other words, all three of the arterial coats entered into the composition of the sac. The aneurism was therefore of the variety called true. The coats of the vessel had yielded to the impulse of the blood contained within it, because they had become much weakened by the process of *atheromasia*, and at the autopsy numerous patches of atheroma were found in the ascending aorta.

The heart was larger and its muscular tissue more abundant than natural. It therefore contracted with greater power, and communicated a more vigorous impulse to the blood in the arterial system, than natural. Thus the hypertrophy of the heart tended materially to shorten this man's life by hastening the time for rupture of the sac to take place.

It is worthy of remark in this place that aneurisms belonging to the ascending portion of the aortic arch are developed most frequently from the front and right side, *i. e.*, the right anterior side, of the vessel, a circumstance which is probably due to the fact that the current of blood from the left ventricle of the heart sets more strongly against that side or part of the ascending aorta than it does against the other sides of that portion of the vessel.

CASE IV. Aneurism of ascending aorta; sudden death; autopsy; pericardium full of blood; rupture of aneurismal sac; hypertrophy and valvular disease of heart.—Sunday, October 17, at 4 o'clock P. M., I made a *post-mortem* examination of the body of a man named Lawrence Malone, æt. 45, born in Ireland, who had died suddenly, between ten and eleven hours before, at his dwelling in 39th Street, near Sixth Avenue. It appears, from the statement of his wife, that the deceased rose about 5 o'clock on that morning to minister to the wants of a sick child. In a little while he went to bed again. Soon afterwards his wife heard him moaning, and, on going to him, found him bathed in cold perspiration, and quite dead. He had been in bad health for several years, complaining of cough with slight expectoration, shortness of breath, and palpitation of the heart. Occasionally he spat blood. He drank to excess. He appeared to be as well as usual on the day before his death.

Body rather thin and pale; lips pale; rigor mortis well marked; pupils symmetrically dilated (somewhat). On opening the pericardium it was found to be distended with fluid and coagulated blood. The heart was very large and fatty (1st variety). The mitral valve was considerably thickened by an interstitial deposit of a semi-cartilaginous character. The aortic valves were much thickened, exhibiting rounded edges and a puckered appearance. They did not close up the aortic orifice completely, and there-

fore permitted regurgitation into the left ventricle of the heart. The lining membrane of the aorta ascendens was thickened and roughened by atheromatous deposits. About one inch above the aortic valves there was an aneurism or pouch-like dilatation of the wall of the artery, developed on the anterior side of the vessel, and having the size of an English walnut. The sac was very thin in many places. The rent was about one-fourth of an inch long, and its direction was longitudinal, that is, parallel with the long axis of the artery. The extravasation of blood of course took place into the pericardium. I did not discover any evidence, on examining the aneurism, that the internal or middle arterial tunics had been ruptured or perforated by ulceration at any time in the history of the affection. The aneurismal swelling appeared to have been produced by a progressive dilatation of all the arterial tunics. The middle coat may have disappeared from the spots where the aneurismal sac was very thin, but the internal coat was still present.

The *lungs* exhibited passive congestion, but in other respects were sound. The *liver* was enlarged and fatty.

Comments.—This man had valvular disease of the heart, namely, insufficiency on the part of those placed at the aortic orifice, together with dilatation and hypertrophy of the left ventricle. The symptoms which were present during life, at least such of them as were described to me, appear to have been produced for the most part by the cardiac disease. They were shortness of breath, palpitation of the heart, dry cough, and occasional attacks of slight hæmoptysis. They denote that the action of the lungs were subject to passive congestions, and that the action of the heart itself was embarrassed.

The aneurism was pouch-shaped or sacculated, small in size, of the variety called true, since all the arterial tunics entered into the formation of the sac, and developed from the front of the aorta a short distance above its origin.

CASE V. Sudden death from rupture of an aneurism of ascending aorta and extravasation of blood into pericardium; autopsy: old pleuritic and pericardial adhesions: hypertrophy and dilatation of heart; dilatation of aortic orifice: multiple aneurism: one involving ascending aorta, another located at commencement of descending aorta, and still another in lower part of thoracic aorta.—Edward Lally, æt. about 45, a native of Ireland, a long-shore man by occupation, and said to be of rather dissipated habits, was engaged, on the afternoon of December 21st, hoisting cotton, when he suddenly fell down and died immediately and almost with the hoisting-rope in his hand. His body was removed to the 5th Ward Station House, where I made an *autopsy* about twenty-four hours after death.

Cadaver large and muscular. Rigor mortis strong. Face exhibited a dusky tinge as it often does in death by asphyxia. The *lungs* were extensively fastened to the thoracic walls by old and very strong pleuritic adhesions. These organs contained more than the normal quantity of pigmentum nigrum and were congested with venous blood. The *pericardium* was more or less adherent to the heart throughout its whole extent by strong white filaments and old fibrous bands or ribbons, which were undergoing absorption—having become elongated or drawn out by the motion

of the heart and considerably thinned or diminished in size at their middle portion. Some of them were so much thinned at the centre as to be nearly ready to break in two. Lying in the meshes of this adventitious tissue, within the pericardial sac, was a considerable quantity of extravasated blood. The interstices of said adventitious tissue were completely filled with blood. The clots were thickest and most abundant on the surface of the auricles, particularly the right one. The *heart* was much hypertrophied and the cavity of the left ventricle much dilated. The aortic orifice also was much dilated. It measured, when closed, or compressed, flat-wise, between $3\frac{1}{4}$ and $3\frac{1}{2}$ inches (English) in width. This measurement indicates that the aortic orifice was between $7\frac{1}{2}$ and $7\frac{3}{4}$ inches in circumference. The aortic valves were thinner than natural, and two of them exhibited a number of little holes near their free margin. Owing to the great width of the aortic opening the semilunar valves could not close it completely or well enough to prevent considerable regurgitation. Perhaps the stretching of the valves consequent upon the progressive dilatation of the aortic orifice had assisted to make them thin and likewise to make the holes in them.

Commencing just above the aortic valves was an *aneurism* of the variety called *fusiform* and *true*, which involved almost the whole of the ascending aorta. It was very large and had the size of my fist or that of a healthy adult male heart. The bulging out of the arterial coats had not occurred symmetrically or equally on all sides of the vessel, for it was more marked or extensive on the right anterior side than elsewhere. Rupture of the sac had been produced near the place where the right branch of the pulmonary artery crossed the aneurism, and through this rent the blood in the pericardial sac already mentioned had been poured out. The aneurism appeared to be full of blood when I opened the thorax. There were no heart clots. The origin of the arteria innominata was dilated almost to the size of my finger (aneurismal dilatation). At the commencement of the descending aorta there was a *sacculated aneurism* located on one side of the artery of the size and shape of the half part of an ordinary apple, which was nearly ready to burst from thinning and softening of its walls (with dark and red discoloration). Towards the lower end of the thoracic aorta there was a spot where the internal and middle coats of the artery had given way or yielded to the impulse of the blood, and the external coat with a layer of condensed cellular tissue upon its exterior was beginning to bulge out, constituting, as I think, the commencement of a common form of the so-called spurious aneurism. The aorta was atheromatous through the whole of the space above mentioned; below the diaphragm I did not examine it from want of time.

The *liver* was large, congested with venous blood, and presented a "nutmeggy" appearance (somewhat) on section. The *spleen* exhibited, on cutting it open, a dark-brown, almost black colour, and a firm consistence. It was also twice or thrice as large as natural. The lesions of this organ had probably been occasioned by stagnation of the blood or chronic venous congestion. The *kidneys* were dark-coloured and congested with venous blood. All the abdominal veins were congested.

Comments.—This man followed a very laborious occupation to gain a livelihood, working 'long-shore,' as it is called, and being often called on to use much muscular strength. Although I made careful inquiry, I could not learn what symptoms he complained of, if any, during life.

This case possesses much more than an ordinary degree of interest. In the first place the aortic aneurism was multiple. Instead of one there were, in reality, three distinct aneurismal swellings developed from the aorta above the diaphragm. One of them was located in the ascending portion of the aortic arch, another at the commencement of the descending aorta, and a third in the lower part of the thoracic aorta. The first-mentioned was fusiform in shape, the second sacculated, and the formation of the third had but just commenced, and therefore it was small in size. The last-named was all the more interesting because it distinctly exhibited to us one of the earliest steps in the formation of false spontaneous aneurism. The internal and middle coats of the vessel had become so much weakened by the process of atheromasia that they yielded or gave way to the impulse of the blood, and thus sustained a solution of their continuity the size of which was increased by the separation of the edges or gaping occasioned by contraction of the muscular fibres belonging to the middle coat that had not yet been destroyed by the process of fatty degeneration. Through the orifice which had thus been made in the internal and middle tunics the blood came into direct contact with the external coat and caused it to bulge outwards. Here we had presented to us the commencement of the formation of the sac in a case of the so-called spurious aneurism. The connective tissue lying on the outside of the bulging portion of the external coat was beginning to multiply itself and likewise to coalesce with said coat. If this man's life had been prolonged for a sufficient length of time, the tumefaction would have continued to expand before the ceaseless pressure and impulse of the blood, until finally a pouch-shaped or sacculated aneurism of the thoracic aorta would have been produced.

In the second place the alterations in the structure of the heart were very strongly marked. The aortic orifice was very much dilated, and had become so large as to be about $2\frac{1}{2}$ inches in diameter. The semilunar valves could not close it completely during the diastole of the heart, and consequently the blood regurgitated from the aorta into the left ventricle after each systole of that organ. We were, therefore, not surprised to find that the cavity of the left ventricle was much dilated, that its walls were much hypertrophied, and that the organ, as a whole, was much increased in size. The heart was also fastened to the pericardium by a great number of strong, old, white, elongated, fibrous threads, cords, and bands, which were the final products of an inflammation of the pericardium that had occurred many years previously. It is possible that this man had been affected with acute rheumatism in childhood or in early youth, and that the pericarditis had been induced at that time by the rheumatic diathesis, a circumstance which it is well known is apt to happen to those who have acute rheumatism during the early periods of life. If such were really the case then the rheumatism, with its cardiac complication, laid the founda-

tion for all the changes in the structure of the heart which subsequently occurred.

Again, while the blood which escaped from the ruptured aneurism in this case was extravasated into the pericardium as we have already seen that it was in the last four cases, a much smaller quantity of sanguineous effusion sufficed to arrest the movements of the heart in this case than in either of the others, because the pericardium happened to be extensively and firmly fastened to that organ by old adhesions. The blood which was poured out from the ruptured aneurism into the pericardial cavity flowed into the meshes and interstices of the network formed by the adhesions, and but a few ounces were required to fill them sufficiently to paralyze the heart. It is worthy of remark that the sanguineous effusion was most abundant on the surface of the auricles, the consequence of which was that the flow of blood from the system at large into the right side of the heart, and from the lungs into the left side of that organ was more or less impeded. Hence the countenance of the cadaver presented the livid hue, and the lungs the congested appearance, which are usually present in death from asphyxia.

CASE VI. Large-sized aneurism of ascending aorta: rupture of sac and extravasation of blood into pericardium; instant death; autopsy; disease not suspected till after death.—Mr. S—— C——, born in the United States, æt. 40, a merchant, of exemplary habits, had been troubled for several years with pains about the chest, shoulders, and arms, which were supposed to be of a rheumatic origin, together with cough. Latterly he had been suffering more severely, and had got a sense of oppression in his chest, which he located beneath the upper part of the sternum. On Thursday evening, July 16th, he was walking up Broadway, going home, and when in front of the Irving Rooms was attacked with faintness. He went into the rooms to rest himself, and to get a stimulant. Shortly after sitting down he instantly expired. His family were very anxious to be informed with regard to the cause of death.

Autopsy, July 18th.—Surface of body and lips pale. Lungs congested (passively). Pericardium filled with fluid and coagulated blood—coagulum equals about four ounces in volume. There is an aneurism of the ascending aorta, the sac of which is nearly as large as my fist. It had broken into the pericardium. The rent is about three-fourths of an inch long and has jagged edges. Heart fatty and well contracted. Aorta atheromatous. Cadaveric rigidity strong. Body had been preserved in ice.

Comments.—The aneurismal sac attained a considerably greater size in this case than in any of those that as yet have been related except the last; among the consequences of which was, that the functions of the neighbouring parts and organs were disturbed more or less considerably by the pressure it occasioned, and that symptoms of a more troublesome and distressing character were produced than we have seen in any previous case. The aneurismal tumour, which, as already stated, was developed from the ascending portion of the aortic arch, was almost as large as my fist, and the symptoms which it produced were mainly due to the encroachment which it made upon

the domain of the surrounding organs. The symptoms, which were narrated to me by the family of the deceased, were all of a subjective character, with the single exception of cough. He complained of pains in the chest, shoulders, and arms, that were supposed to be of a rheumatic character, which, as the aneurism grew larger, became more severe. The cough also appears to have become more troublesome as the disease advanced. Finally he got an ill-defined sense of oppression and distress which appeared to him to be located immediately behind the upper part of the sternum, where the aneurismal tumour was found on making the autopsy. Of course I am not informed with regard to what physical signs were discovered on examining his chest during life. The post-mortem examination, however, showed that dulness on percussion ought to have been detected over the site of the tumour, together with the aneurismal bruit; and the writer now begs leave to ask, whether it is not probable that if this gentleman's case had been thoroughly investigated, and a comprehensive view of it taken, the symptoms both subjective and objective being submitted to a rigid interpretation, both individually and collectively, and the method of exclusion employed as far as practicable, a diagnosis of aortic aneurism would have been made with reasonable certainty? It is, however, undoubtedly true that the professional advisers of this gentleman would have been much more likely to have made a correct diagnosis if they had born in mind the fact that aneurism of the thoracic aorta occurs pretty frequently, instead of leaving it entirely out of their calculation while examining the patient from time to time.

CASE VII. Aneurism of ascending aorta: sudden death: autopsy; extravasation of blood into pericardium from ruptured aneurismal sac.

—John Duck, a cartman, æt. about 40, and born in Ireland, while pursuing his occupation met with an accident which made it necessary for him to overtax his strength in lifting. This occurred on Thursday afternoon, September 2d. He began directly to complain of pain and distress in his chest. His friends thought him to be suffering from a strain. On the following day he went out with his cart to do some light work. About one o'clock P. M., while his horse was feeding, he went into a grocery store. After he had been there a few minutes he suddenly fell down on the floor, and immediately expired. He did not utter a complaint, nor even an exclamation.

Autopsy, Saturday, September 4th, twenty-two hours after death.—Body fresh and looking quite natural. Rigor mortis very strong. The pericardium is distended with fluid and coagulated blood. The clot fully equals eight ounces in volume. This blood has been poured out from an aneurism of the ascending aorta by rupture of the sac. The fissure is one-third of an inch long. The lungs exhibited passive congestion. There were no pleuritic adhesions, except at the apex of the left lung, where some old tuberculous deposits were found, the effects of which had been thoroughly repaired, and the tuberculous matter itself had undergone the calcareous transformation. Dr. Budd took the aneurismal specimen.

This case does not seem to require any extended comment, since its general features are similar to most of those that we have hitherto related. We would only remark that the suddenness with which death was produced was very striking. This man fell down upon the floor and died without uttering a complaint or even an exclamation.

CASE VIII. *Aneurism of ascending aorta: sudden death from rupture of the sac and extravasation of blood into the parenchyma of the right lung, and into the right pleural cavity: autopsy: old pericardial and pleuritic adhesions*—William Cook, æt. 35, born in Kentucky, a commission merchant, had complained for fully four years of pain in his breast, and notwithstanding the use of many remedies to obtain relief it had grown progressively worse. On Tuesday night, December 28th, he coughed a good deal, and spat some blood. On Wednesday night, December 29th, he coughed violently, spat a considerable quantity of blood, and died suddenly in a paroxysm of coughing. The existence of aneurism was not suspected. I gather the above-mentioned information concerning him from his relatives and friends, post-mortem.

Autopsy, December 30th, about ten hours after death.—Surface of body, pale. Rigor mortis strong. On dividing the cartilages of the right side of the chest a yellowish serum began to flow out of the right thoracic cavity, and, on turning up the sternum, that cavity was found to contain a large quantity of blood (mostly coagulated with some yellowish serum floating above it), whereby the right lung was compressed and the mediastinum pushed over towards the left side. We removed from the right pleural cavity over one gallon of fluid and coagulated blood, and then found the right lung to be firmly adherent to the walls of the chest throughout its superior portion, and to contain a considerable number of old tuberculous concretions in its parenchyma in the same locality. The anterior margin of the superior lobe was adherent to a large pouch-shaped aneurism of the ascending aorta, and the pulmonary tissue was here infiltrated with blood, which had been extravasated from the aneurism. The left lung contained less than the usual quantity of blood, but in other respects was natural. There were scattered filamentous and band-like adhesions of an old date in the pericardial sac, connecting together its visceral and parietal surfaces. They appeared to be undergoing absorption. The ventricles of the heart were firmly contracted. The organ was moderately hypertrophied. The aneurism was large, pouch-shaped, and projected from the ascending aorta in a direction upwards and towards the right side. It had burst at the part where the right lung adhered to it. Hence the blood was extravasated, first into the pulmonary tissue; afterwards the rent became larger and the blood was poured out in great quantity into the right pleural cavity. The ascending aorta was atheromatous. The liver and spleen were enlarged, apparently from stagnation of blood or chronic venous congestion.

Comments.—This man died of internal hemorrhage. The sac of a large aneurism, developed from the ascending aorta, burst into the cavity of the right pleura, and so great a quantity of blood was effused into that cavity as to quickly destroy his life. Hence the surface of the corpse presented a pale, waxen, and exsanguinated appearance, which afforded a marked contrast to the external appearances that were observed in the last

six cases, wherein the aneurism pursued a different course, and burst into the pericardial cavity, and drowned the heart with blood, as has already been pointed out.

Now, aneurisms developed from the aorta within the thorax terminate in death by bursting into a considerable number of cavities and organs besides the pleura and the pericardium, which are mentioned above. Perhaps the most comprehensive view which we can obtain of the different methods in which aortic aneurism within the thorax terminates in death, is afforded by a critical examination of Dr. Crisp's table of five hundred and fifty-one cases of spontaneous aneurism, to which reference has already been repeatedly made. Such a reference to that table shows that thoracic aneurism of the aorta very often proves fatal by bursting into the cavity of the pericardium,¹ and not unfrequently by breaking externally. It also shows that in nine instances an aortic aneurism within the chest burst into the *oesophagus*, in five instances into the *trachea*, in five cases into a *bronchus*, either left or right, in five cases into the *pulmonary artery*, in three cases into the *right auricle of the heart*, in two cases into the *right ventricle*, in two cases into the *left ventricle*, in four cases into the *superior vena cava*, in eighteen cases into one or other of the *pleural cavities*, in three cases into the *mediastinum*, and in five cases into the *tissue of the lungs*. From this it appears that aneurisms developed from the portion of the aorta contained within the thorax generally prove fatal, by bursting either into the cavity of the pericardium, or that of the pleura, or externally, but that in exceptional instances death is produced by effusion of blood into the various organs above mentioned.

A critical examination of Dr. Crisp's table shows further, that no less than twelve cases of thoracic aneurism proved fatal, not from rupture of the sac, but from *pressure* made by the aneurismal tumour upon the *trachea*, inducing thereby *dyspnoea*, *orthopnoea*, *croupal symptoms*, *exhaustion*, and death. This point will be more attentively considered when we come to the special discussion of the symptomatology and the diagnosis of aortic aneurism.

CASE IX. *Sacculated aneurism of thoracic aorta : sudden death from rupture thereof : autopsy.*—David Hogue, æt. 50, by occupation a baker, died suddenly and unexpectedly about 4 o'clock P. M., on Saturday, April 17th. I was informed that he had complained of pain in the back, which he referred to his kidneys, for some time previous to death, and that his habits were intemperate.

Autopsy nineteen hours after death.—Rigor mortis very strong. Surface of body, lips, gums, etc., very pale. Cartilages of ribs ossified. *Right* pleural cavity contains about one gallon of fluid and coagulated blood—coagulum small. Inferior lobe of right lung much compressed, flattened

¹ In ninety-eight cases of aneurismal disease involving the ascending aorta, the tumour burst into the pericardium in thirty instances, and opened externally six times. Vide Dr. Crisp, *op. cit.*, p. 134.

in shape, and about two inches thick. *Left* pleural cavity contains about one pint of blood. On posterior surface of left lung, directly beneath the pleura pulmonalis, there are several small flat-shaped clots of extravasated blood, which raise that membrane above the surrounding surface. The parenchyma of this lung, on section, exhibits several spots in which blood has been effused into its texture (pulmonary apoplexy). Both lungs contain an abnormally abundant quantity of pigmentum nigrum. The posterior mediastinum is extensively invaded with extravasated blood. There is also some extravasated blood in the diaphragm which lies directly underneath both its pleural and peritoneal investment. The peritoneal cavity (abdomen) contains about one gallon of fluid and coagulated blood. There are clots of considerable size in each hypochondrium. The source of all this hemorrhage was a ruptured aneurism of the thoracic aorta situated just above the diaphragm. *Heart* enlarged and fatty. This organ also exhibits on its exterior two milk-spots of an inflammatory origin, one large in size and situated over the right ventricle, the other smaller and situated over the left ventricle near the apex. The muscular structure of the heart is softer than natural, and the muscular tissue throughout the body is in the same condition. The mitral valve is somewhat thickened. There are no heart clots. The lining membrane of the aorta exhibits abundant deposits of atheroma, by which it is thickened and roughened. Its color is pale lemon yellow. *Liver* very large, empty of blood, and presenting a "nutmeggy" appearance on section. *Spleen* smaller than natural, presenting externally a shrivelled appearance and a dirty purplish white colour. It also exhibits on its peritoneal surface irregularly shaped grayish white firm granules, formed from old plastic exudation, in large number. Texture of spleen very soft and pale red in colour. The *kidneys* present an exsanguinated appearance (pale colour), but in other respects are natural.

Comments.—This man also died from loss of blood in the way of an internal hemorrhage, which proceeded from a ruptured aneurism of the thoracic aorta. The case is a remarkable one, especially on account of the large quantity of blood which was extravasated, and the wide space through which the extravasation was diffused. It was met with in both pleural cavities, in the mediastinum, beneath the pleura pulmonalis and in the pulmonary tissue, beneath both the pleural and peritoneal investments or coverings of the diaphragm, and in the cavity of the abdomen. In quantity it was enormous, and was estimated as exceeding two gallons.

The growth of the aneurism in this case was not unattended with the development of morbid phenomena, for he complained of having a good deal of pain in his back, which he ascribed not to the real cause, but to an affection of his kidneys. It will not be forgotten that the aneurismal tumour was located near the lower end of the thoracic aorta, where that vessel is placed in relation with the bodies of the inferior dorsal vertebræ.

The heart was also diseased. It was enlarged, flabby, soft, and fatty. Besides, there were two milk-spots on its exterior, which had their origin, a long time previously, in an inflammation of the pericardium. The reader has doubtless observed that the heart was diseased in nearly all the cases that have been narrated in this essay. In seven of them it exhibited

changes in structure to greater or less extent, in two of them its condition is not stated, and in one instance, not yet related, it appears to have been nearly normal. In three cases there were distinct evidences of old pericarditis. In five cases there was more or less thickening of either the mitral or aortic valves, or both of them. In two cases the aortic valves were insufficient and permitted the blood to regurgitate into the left ventricle. In five cases it is stated that the heart was hypertrophied, and in two additional cases the muscular structure of the organ was undergoing fatty degeneration. From these facts, we infer that the same causes which induce the development of aortic aneurism are exceedingly apt to induce changes in the structure of the heart also.

This man was intemperate. It is likewise worthy of remark in this connection, that, of our ten cases, seven are known to have used alcoholic drinks to excess either habitually or occasionally, while three of them were reported to have been hard drinkers.

CASE X. Sudden death of a soldier occasioned by the rupture of a spontaneous aneurism of the abdominal aorta; a large quantity of blood extravasated into the cavity of the peritoneum; autopsy.—Camp Observation, Maryland, Tuesday, October 15, 1861. A young soldier, an Irishman, aged 22, died suddenly last evening at the camp of the Sixty-ninth Pennsylvania Volunteers. He was a good soldier, and had never been excused from duty. On Sunday he was on picket. On Monday he was at battalion drill in the afternoon and at dress parade in the evening, after which he ate a hearty supper. He had not complained of any sickness except occasionally of pains in the epigastrium; but he had never been put upon the sick report. About eight o'clock last evening he was standing near the door of his tent, joking with a comrade, when, without warning, he fell to the ground and almost immediately expired. A few minutes afterwards I saw the body. The lips, gums, and surface of the body generally were very pale and blanched, so much so that I did not hesitate to express the opinion that death had been occasioned by internal hemorrhage. Pupils (both) dilated symmetrically. It was stated that he had sometimes indulged in excessive drink.

Autopsy thirteen hours after death.—Rigor mortis strong; muscular system well developed; cavity of abdomen filled with fluid and coagulated blood; I removed from that cavity more than six quarts which had flowed out from a ruptured aneurism of the abdominal aorta; the aneurism was developed from the front of the aorta just below the origin of the celiac axis, and protruded forwards between the crura of the diaphragm; it obtained the size of a Sicilian orange, and its anterior wall was quite thin; the fatal rent in it was rather more than one inch in length; there were atheromatous deposits in its walls; neither stomach nor intestines were adherent to it.

The digestive tube was healthy. The liver was pale (anemic), and exhibited some thickening of Glisson's capsule in spots. The spleen was fastened to the diaphragm by old adhesions. Its capsule was also thickened and presented a pearly colour. Its parenchyma was firmer than natural. The kidneys were pale (anemic), and contained more than the usual quantity of fat in their pelvis.

The heart was natural in size, firmly contracted and empty of blood. It exhibited somewhat more fat than normal on its exterior. In the ascending aorta spots of atheroma were found.

Comments.—This case of aneurism affecting the abdominal aorta proved fatal from rupture of the sac and extravasation of blood into the peritoneal cavity. Indeed, aneurismal tumours involving that vessel below the diaphragm often terminate by bursting into the peritoneal sac. But the rupture of the sac and the effusion of blood consequent thereon do not always occur in that direction. Aneurisms of the abdominal aorta not unfrequently burst into some portion of the intestinal canal to which they have contracted adhesions. The duodenum from its anatomical relations with the aorta is especially liable to become affected in that way, but I have also known the rupture of the sac to occur into the transverse colon. Abdominal aneurisms also burst oftentimes behind the peritoneum. Furthermore, they sometimes break into the ascending vena cava, into the left pleural cavity, into the pulmonary tissue, and into the mediastinum.

Aneurisms of the abdominal aorta occur much less frequently than aneurisms of the thoracic aorta, a circumstance which has already been pointed out, together with the reasons therefor.

Aneurisms of the abdominal aorta can be diagnosticated much more readily than aneurisms of the thoracic aorta, since the aneurismal tumour can, for the most part, be felt through the abdominal walls without much difficulty, and the pulsation together with the aneurismal thrill duly appreciated by the touch. I do not doubt that in the case just related a diagnosis would have been made during life, provided the subject had been subjected to a thorough physical examination. However, he was never subjected to such an examination, since the subjective symptoms produced by the disease did not at any time prove troublesome. The only symptoms of which he ever complained that were referable to the aneurism, consisted of occasional pains in the epigastrium. It should be remembered that the aneurism was located just below the cardiac axis, that it protruded from the front of the aorta, that its size was small, and that it did not encroach upon any important nerves or other organs. Hence it happened that the disease did not occasion any considerable amount of distress.

Symptoms and Diagnosis of Aortic Aneurism.—The following considerations, which are founded upon the topographical relations that exist between aneurismal tumours connected with the various parts of the aorta, and the neighbouring organs, will enable us to comprehend the symptomatology of this disease more completely, and to interpret its phenomena, especially those which are subjective in character, more correctly than we otherwise would be likely to do.

The ascending portion of the aortic arch is contained in the pericardium, and hence the aneurisms of that part of the vessel are very apt to burst into the pericardial cavity. It is situated just behind the sternum. It is

crossed at its commencement by the pulmonary artery, and the appendix of the right auricle, and has the root of the right lung behind, the vena cava descendens on the right side, and the pulmonary artery together with the left auricle on the left side. Aneurismal tumours of the ascending aorta may therefore compress either the superior cava, or the right auricle, or the adjoining part of the right ventricle, or the pulmonary artery, or the left auricle, and may, too, ultimately burst into any of these organs or parts of organs. In the majority of cases, however, they open into the pericardial sac. They may compress the superior cava to such extent as to seriously impede the flow of venous blood from the upper part of the body, and occasion thereby stagnation of the blood in that part of the system with all the consequences legitimately pertaining thereto. They may, in extreme cases, effect even a complete closure of that vessel by lateral pressure.

Aneurism of the ascending aorta, developed in the situation of the aortic sinuses, in the great majority of cases proceeds from the right coronary sinus. This circumstance appears to be mainly due to the fact that the regurgitation of blood upon the sinuses occurs chiefly on the right anterior aspect of the vessel. (Vide *Gray's Anatomy*, p. 364.) Aneurism of the ascending aorta, originating above the sinuses, implicates most frequently the right anterior wall of the vessel; this is probably owing mainly to the impulsion of the blood against this part by the contractions of the left ventricle, as has already been stated. The direction of the aneurismal tumour is also chiefly towards the right of the median line. If it attains a large size and projects forwards, it may cause absorption of the sternum and the cartilages of the ribs, usually on the right side, and appear as a pulsating tumour on the front of the chest, just below the manubrium, which may burst externally, or into the pericardium, or may compress and disturb the functions of the right lung, the trachea, bronchi, or œsophagus, and may even break into either of those organs (*op. cit.*, p. 365). Pressure exerted in this way upon the pulmonary tissue generally occasions dry cough. When it is exerted upon the trachea or bronchi, it usually produces cough and dyspnœa of an asthmatic character, by irritating the bronchial nerves and thus inducing spasm of the bronchial muscles. When it is exerted upon the œsophagus it generally occasions dysphagia.

With regard to the anatomical relations of the *transverse portion of the aortic arch*, the reader is reminded that the vessel here lies upon the trachea, the œsophagus, and the thoracic duct; that the left phrenic and pneumogastric nerves pass down in front of it; that the left recurrent laryngeal nerve, which, with its fellow of the opposite side, is the chief motor nerve of the laryngeal muscles, winds round it; and that from its convexity three large arterial trunks are given off, which supply the head, neck, and upper extremities with blood. Now, an aneurismal tumour developed from the posterior side or right aspect of the vessel, its usual site

when the transverse part of the arch is affected with this disease, may press upon the trachea, and impede the breathing, or produce cough, hæmoptysis, or stridulous respiration, or it may ultimately burst into that tube, producing fatal hemorrhage. Again, its pressure upon the laryngeal nerves may produce spasm of the laryngeal muscles, and give rise to symptoms which so closely resemble those of laryngitis, that the operation of tracheotomy has in some cases been resorted to from the supposition that disease existed in the larynx; or, it may press upon the thoracic duct, and destroy life by inanition; or, it may involve the œsophagus, producing dysphagia; or, it may burst into that tube, and then fatal hemorrhage will occur. Again, the innominate artery, or the left carotid, or the left subclavian, may become so much obstructed with coagulated blood, in connection with an aneurism of the aortic arch, as to produce a weakness, or even a disappearance of the radial pulse on one or other side; or, the aneurismal tumour may present itself at or above the manubrium, generally either in the median line, or on the right side thereof (*op. cit.*, p. 365).

Aneurism affecting the descending thoracic aorta usually projects backwards and to the left side, causing absorption of the vertebræ and corresponding ribs; or, it may press upon the trachea, left bronchus, œsophagus, and the right and left lungs, generally the latter. When rupture of the sac occurs, it usually takes place into the left pleural cavity; less frequently into the left bronchus, the trachea, the œsophagus, the right pleura, or into the parenchyma of the lungs. *In this form of aneurism, pain is almost a constant and characteristic symptom, existing either in the back or chest, and usually radiating from the spine around the left side.* We have already seen that pain in the back was a prominent symptom produced by aneurism of the descending thoracic aorta in Case IX. This symptom depends mainly, for its causation, upon the aneurismal sac compressing the intercostal nerves against the bone (*op. cit.*, p. 365).

Aneurism of the abdominal aorta is developed in nearly equal proportions from the anterior and posterior sides of this vessel near the celiac axis (*op. cit.*, p. 420).

When an aneurismal sac projects from the posterior side of the abdominal aorta, it usually causes absorption of the bodies of the vertebræ with which it comes in contact, and forms a pulsating tumour, that presents itself in the epigastric or left hypochondriac regions, accompanied by symptoms of disturbance of the digestive function and of the intestinal canal. *Pain is invariably present*, and is usually of two kinds: 1, a fixed and constant pain in the back, caused by the tumour pressing on or displacing the branches of the solar plexus and splanchnic nerves, and, 2d, a sharp lancinating pain, radiating along those branches of the lumbar nerves which are compressed by the tumour; hence the pain in the loins, the testes, the hypogastrium, and the lower extremity, especially or chiefly observed on the left side. This form of aneurism usually bursts either into the cavity

of the peritoneum, or behind that membrane in the left hypochondrium; or, it may expand into a large aneurismal sac, extending down as low as Poupart's ligament and the groin, in which situation it has sometimes been punctured on the supposition that it was an abscess (*op cit.*, p. 420).

When an aneurismal sac projects from the front of the abdominal aorta, near the cœliac axis, it also forms a pulsating tumour in the epigastric or left hypochondriac regions, and is usually attended with symptoms of disturbance of the alimentary canal, such, for example, as sickness, dyspepsia, and constipation, which result from compression of the solar plexus or the splanchnic nerves effected by the tumour. *It is likewise accompanied by pain, which is constant, and nearly always fixed in the epigastrium, loins, or some part of the abdomen:* the radiating pain being rare, since the lumbar nerves are seldom implicated. This form of aneurism may burst into the peritoneal cavity, or behind the peritoneum into the connective tissue which is embraced between the layers of the mesentery, or, more rarely, into the duodenum, or the transverse colon: it generally does not extend backwards so as to affect the spine (*op. cit.*, p. 420). In Case X., which, as the reader will remember, belongs to this category, the pain was located in the epigastrium, and was not severe, but the aneurismal tumour happened to be small in size.

In other cases of aneurism of the abdominal aorta the pain is very intense. I remember one instance that produced a very profound impression upon me at the time I witnessed it, which was many years ago. A middle-aged man had complained for a long time of having great pain in his back, which appeared to be located deep in the lumbar region, and had not been benefited by any medication. My attention was especially directed to him by a brother medical officer, under whose care he had been for a considerable time, with the statement that he was an inveterate malingerer. Struck with the appearance of this man's countenance, which indicated, as it seemed to me, great physical distress, I subjected him to a searching physical examination, and, in the course of it, found that he had an aneurism of the abdominal aorta, the sac of which was almost as large as my fist. The pulsation and the aneurismal thrill were strongly marked, and the aneurismal bruit was distinctly heard on using the stethoscope with proper care. Ultimately, this aneurism burst into the transverse colon, and the patient died of hemorrhage. From the day when I examined that man till the present time, the presence of a chronic persistent pain in the back has always led me to inquire specially into the condition of the aorta.

Concerning the symptoms produced by thoracic aneurism, Dr. Crisp remarks that they depend much upon the situation, size, and amount of pressure exerted upon the surrounding organs by the aneurismal tumour, together with the condition of the heart and valves. When located in the ascending aorta, the sac is generally smaller, and the pulsation is heard more distinctly on the right side of the median plane than elsewhere; and

if the tumour appears externally it is situated mostly on the right of the sternum. When located in the transverse portion of the arch, the sac usually projects backwards, or upwards and backwards; and when situated in the descending thoracic, it generally extends towards the left side of the spinal column, often producing absorption of the bodies of the dorsal vertebrae with which it comes in contact, and occasionally protruding externally. The pressure resulting from the progressive expansion of the aneurismal tumour may be exerted upon the lungs, trachea, bronchi, and recurrent laryngeal nerves, producing cough, dyspnoea, orthopnoea, hæmoptysis, loss of voice, and a sense of suffocation; upon the œsophagus, occasioning dysphagia and simulating stricture of that tube; upon the vena cava superior, producing turgescence of the jugular veins, together with more or less stagnation of the blood throughout the head, neck, and upper extremities, and, in rare examples, occlusion of the vena cava itself; or upon the thoracic duct, producing debility, emaciation, and, ultimately, death by starvation. Pains, sometimes of a dull, at others, of a lancinating character, are felt over the seat of the tumour, and they often extend to the shoulder, elbow, and fingers. In one instance, Dr. Crisp saw œdema of the hand. Some patients having thoracic aneurism exhibit an anxious countenance, and are troubled with frightful dreams, startings from sleep, etc. In others, dyspeptic symptoms, such as flatulence, gastrodynia, acidity, eructations, and vomiting, are present. This derangement of the functions of the stomach, which results from the pressure exerted by the aneurismal sac upon either the pneumogastric or the sympathetic nerves, is a very common attendant upon thoracic aneurism; and numerous patients affected with this disease have been treated for indigestion. But the error that is most frequently committed in the diagnosis of thoracic aneurism, consists in attributing the pain, which is so often met with in the chest, and occasionally in the shoulders and arms of persons affected with this disease, to rheumatism. This mistake was made in Cases II. and VI., as we have already seen. If, however, the symptoms are thoroughly investigated, and the peculiar character of the pain is taken into account, these errors will be less frequent. For example, the patient will, in some cases, complain of being attacked with pain after a blow, strain, or fall; in others, after great physical exertion or mental excitement. In the history of Case VIII., that of John Duck, it is related that this man was seized with pain and distress in his chest directly after he had overtaken himself in lifting. The nature of the pain produced by aortic aneurism depends much upon the degree of pressure exerted by the tumour, and the structure and office of the parts that are pressed upon; if a nerve of sensation be involved, it will be neuralgic in character, and will shoot along the course of the nerve, at intervals, to its extremity of distribution; if bony structures be implicated, it will generally have a dull, heavy, aching character; sometimes also shooting and lancinating, and occasionally burning. In some cases where the

aneurismal tumour is small, and the adjoining structures not involved, but little, if any pain is present. In some rare instances, where the sac is even large, and the structure and position of the surrounding parts much altered, but slight suffering has been experienced. Dr. Law, of Dublin, justly attaches much importance to the dull aching pain in the back, which is generally present in cases of aneurism, involving either the descending thoracic or abdominal aorta. He says: "On the whole, then, the pain when present seems to us the least doubtful sign of aortic aneurism. At least, we feel bound to say, its beacon light has guided us more than any other to detect disease." I suppose that the subjective, and not the objective, signs of the disease are here referred to. Some patients afflicted with these forms of aortic aneurism feel distinct pulsation on pressing the spine against a hard substance; and, according to Dr. O'Bryen, a good method of examination in cases where the disease affects the descending thoracic, consists in placing one hand on the sternum and the other on the back. (*Crisp's Treatise on Diseases of the Bloodvessels*, pp. 128, 129.)

The radial pulse does not appear to be affected by thoracic aneurism unless the innominate or the left subclavian artery is obstructed by the disease. If the innominate artery be partially occluded by coagulated blood, or by the pressure of the aneurismal tumour, the pulse in the right wrist is generally weakened thereby; if that vessel be completely occluded, the pulse in the right wrist can no longer be felt. If the left subclavian artery be either partially or completely closed up by the aortic aneurism or its contents, the pulse in the left wrist becomes either proportionally weakened or disappears altogether. Dr. Billing has described a condition of the pulse which he calls "resilient," and considers to be characteristic of aortic aneurism (*op. cit.*, p. 130), but I am not familiar with it.

The *physical signs of aortic aneurism* are, if the tumour can be felt externally, that is, examined from the exterior of the body, mainly such as belong to surgical aneurism in general. The aneurismal sac pulsates synchronously with the contractions of the heart, and, generally, each pulsation of the tumour is accompanied by a peculiar jarring sensation called the aneurismal thrill, and by a peculiar sound, which is usually more or less harsh in tone, called the aneurismal bruit. A feature in the pulsation of aneurismal tumours, which is singular and quite characteristic, is that the sac does not rise up or move in only one direction, but expands outwards in all directions with the impulse of the blood, and this may generally be discerned without much difficulty by grasping the aneurismal tumour with one or both hands. But, aortic aneurism cannot be subjected to manual examinations, unless the disease is located in the abdomen, or, when situated in the chest, the aneurismal sac projects above the manubrium or through the thoracic walls. In a large majority, however, of the cases of thoracic aneurism, the sac does not protrude externally, and, therefore, the tumour cannot be examined with the sense of touch. In such cases the

physical signs are only such as may be recognized and appreciated with the sense of hearing. These signs are flatness or dullness, detected by percussing the walls of the chest over the seat of the aneurismal tumour, and a blowing, rasping, or grating sound heard by auscultation in the same locality. The blowing or bellows sound is mostly heard if the aneurism be small and contains but little coagulum; in large aneurisms filled with coagula, this sound is often absent. Dr. Law, Gendrin, and others, state that a double sound is generally present in thoracic aneurism (*op. cit.*, pp. 130, 131). Gendrin says that the second sound is not perfectly isochronous with the diastole of the ventricle. I can readily understand why a second sound might be present in an aneurism of the ascending aorta, provided there was insufficiency on the part of the aortic valves, and regurgitation of the blood into the left ventricle following each contraction, but, at the same time, I should expect the aneurismal sound to be more or less completely masked by the heart sound. And when we come to reflect how frequently aneurism of the aortic arch is accompanied by organic disease of the heart, we are ready to estimate aright the value of the auscultatory sounds of thoracic aneurism in a diagnostic point of view.

The symptoms produced by thoracic aneurisms are exceedingly liable to be mistaken for those connected with other diseases. We have already seen that the pains in the chest, shoulders, and arms are often erroneously referred to a rheumatic origin. The same mistake is commonly made with regard to the pain in the back, sides, loins, etc. Again, when the aneurismal tumour compresses the lungs and air-passages it may be erroneously supposed from the cough, dyspnoea, occasional hæmoptysis, etc., which are not unfrequently present, that the patient has phthisis pulmonalis. On this point Hodgson, a high authority, says: "There is, however, one circumstance, independent of others, which in some instances will probably assist us in forming the diagnosis: in phthisis the expectoration is either puriform or thick and clotted; but in aneurisms which are not accompanied with disease in the lungs, as far as I have observed, it always consists of a thin, frothy mucus." (*Vide Hodgson on Diseases of Arteries and Veins*, p. 93: London, 1815.) By taking into account the whole history and progress of the case, together with the physical signs, important assistance will also be derived in coming to a correct conclusion. When the aneurismal tumour presses upon the recurrent laryngeal nerves, spasm of the laryngeal muscles is produced, and it may be erroneously supposed that the patient has laryngitis; but in such a case the employment of the laryngoscope will at once expose the error. The aneurismal tumour compressing the trachea and bronchi may induce spasm of the bronchial muscles, accompanied with great difficulty in breathing, and thus lead to the conclusion that the disease is asthma. Again, when the aneurismal tumour compresses the œsophagus it produces dysphagia, and not unfrequently occasions the surgeon to suppose that stricture of that tube is present. If, under

such circumstances, an attempt were made to pass an œsophagus bougie into the stomach, it might cause the aneurismal sac to be ruptured, and occasion the patient to die, as it were, under the surgeon's hand. Hence Erichsen advises that, in all cases of difficulty of deglutition, dependent on lesion of the œsophagus, the thorax should be examined with a view to ascertain whether thoracic aneurism is present, before any treatment by dilatation is undertaken. Finally, a pulsating empyema has been mistaken for aortic aneurism; and Dr. Crisp admits that he once committed this error. (*Vide op. cit.*, p. 133.) It may, for the most part, be avoided by subjecting the pulsating tumour and the neighbouring parts to a careful examination by auscultation and percussion, as in that manner the real character of the disease can scarcely fail to be ascertained, especially if the general symptoms, including the history of the case, are, at the same time, allowed to have due weight in the formation of an opinion. Scrofulous tumours at the root of the neck offer in general but little liability to be mistaken for internal aneurism, since their multiple character, their indurated feel, their uneven exterior, their pulsation occurring in only one direction, namely, *from* the artery in contact with which they are placed, almost always plainly indicate their real nature.

The *diagnosis* of aortic aneurism is a matter of considerable importance to the surgeon who is about to operate for the cure of aneurismal disease in the surgical regions of the body, for by paying attention to it he may save himself from regret and mortification. Sir Astley Cooper once lost a patient upon whom he was operating for popliteal aneurism, from the bursting of a small aneurismal tumour of the ascending aorta. The patient died during the operation; and four cases of a similar kind are related in Dr. Crisp's table of aneurisms, as occurring either during or after the operation. (*Vide op. cit.*, p. 128.)

Treatment of Internal Aneurism.—But, *cui bono*, is a question which will doubtless be asked by some of the readers of these pages. What practical benefit will accrue to our patients from a more careful, exact, and thorough application of our knowledge of this variety of arterial disease? We answer that, by so doing, we shall secure manifold benefits to those afflicted with internal aneurism, more especially to those having the aortic form of it. For example, those who have thoracic aneurism will less frequently, through error in diagnosis, be subjected to treatment for rheumatism, or asthma, or chronic bronchitis, or pulmonary consumption, or stricture of the œsophagus—treatment which, in many cases, has proved to be not only useless, but also highly detrimental to this class of patients. Moreover, they will not be subjected to the operation of tracheotomy, on the erroneous supposition that they have disease of the larynx or trachea, as I have seen happen in one instance of thoracic aneurism, and as has doubtless occurred in many other cases of this disease. Furthermore, the real nature of their disease being known, remedial measures may be suc-

cessfully employed to procure relief from suffering, to retard the progress of the disease and to prolong life, and, *possibly*, to effect a permanent cure of the patient. On this point, Hodgson uses the following strong language: "It is scarcely necessary to cite authorities to prove the possibility of arresting the progress of aneurisms by a practice suggested by Hippocrates, and confirmed by the experience of Valsalva, Albertini, Morgagni, Lancisi, Guattani, Sabatier, Pelletan, and Corvisart. I cannot, however, avoid expressing my conviction, that if it were rigidly adopted, internal aneurisms would not be regarded as constantly fatal, which opinion has hitherto paralyzed that assistance which art can afford in their treatment. The practice is founded upon reason, and experience has amply proved its importance, but its merits have not hitherto been generally appreciated." (*Vide Hodgson On Diseases of the Arteries and Veins*, pp. 149, 150, 151, London, 1815.) He states further that Pelletan has narrated fourteen cases of aneurism, every one of which was materially benefited by this practice, and in two of them permanent cures appear to have taken place.

Now, the *practice* which is here referred to, is that which constitutes the *medical treatment* of aneurism. It is so called in contradistinction to the *surgical treatment* of that disease which consists in the employment of some operative procedure, such as the application of either the ligature or compression; the ligature being employed at the present day either on the principle of Hunter, or that of Auel, or that of Brasdor, making use of the plan best adapted to the case. Compression is applied at this day only to the arterial trunk between the aneurism and the heart, and not to the aneurismal tumour itself, as was practised by the ancients. Acupressure is also coming into favour in the surgical treatment of aneurism in the extremities of the body.

It is obvious that the surgical methods of treatment cannot be employed for the relief of internal aneurism, unless the disease be located in the innominate artery, or in the first portion of the course of the left carotid or the left subclavian. For such aneurisms it may be found advisable to employ the ligature after the method of Brasdor; at all events, it may be quite optional with the surgeon to use that plan of surgical treatment; but for the great mass of internal aneurisms no plan of operative treatment whatever is admissible. Hence, we come legitimately to the consideration of the medical treatment of aneurism, which is adapted exclusively to the relief of internal aneurisms, and never to that of external aneurism, according to the prevailing surgical views upon that subject at the present time.

After a long analytic, observative, historical, and exhaustive dissertation upon the spontaneous cure and medical treatment of aneurism, Mr. Hodgson (*op. cit.*, pp. 163, 164), says, and to his statements very little is to be added from more recent observations: "I think I am warranted in the following conclusions:—

"First. The deposition of coagulum in the cavity of the aneurismal sac and the artery leading into it, is the mode by which the spontaneous cure of aneurisms is, in most instances, effected.

"Secondly. The coagulum is subsequently absorbed, and the sac and the artery leading into it subsequently contract, until the one becomes an imperious cylinder, and the other a small fleshy tumour.

"Thirdly. In some instances the cure is effected by the obliteration of the cavity of the sac without any obstruction taking place in the calibre of the artery from which the disease originates; in this manner a cure may take place in aneurisms of the aorta.

"Fourthly. The formation of coagulum being a general occurrence in aneurisms, it is an important object to prevent the increase of the sac, that the deposition of coagulum may proceed to such an extent as to obliterate its cavity.

"Lastly. It is the force of the circulation which causes the enlargement of the sac, and its ultimate rupture; hence, the diminution of the force of the circulation is the principal indication in promoting the spontaneous cure of aneurisms." (*Op. cit.*, pp. 163, 164.)

The principal indication to be accomplished in the *medical treatment* of aneurism is very clearly pointed out in the last paragraph. Hodgson elsewhere also says: "On this subject it is sufficient to observe that the general means of diminishing the force of the circulation are repeated blood-lettings, abstinence, attention to diet, perfect quietude, the absence of such states of the mind as peculiarly affect the circulation, and attention to the condition of those organs, more particularly of the alimentary canal, which exert a peculiar influence over the action of the heart and arteries." (*Op. cit.*, p. 145.)

With regard to bloodletting as a leading part of the medical treatment of aneurism, Morgagni (Letter 17, art. 30) says: "When Valsalva had taken away as much blood as was requisite, he made it a custom to diminish the quantity of meat and drink more and more every day till he came so far as to allow only half a pound of pudding in the morning, and in the evening half that quantity, and nothing else except water, and this also within a certain weight. After he had sufficiently reduced the patient by this method, so that he could, by reason of weakness, scarcely raise his hand from the bed in which he lay by Valsalva's order, from the very beginning of the disease, he increased by degrees every day the quantity of aliment until the necessary strength returned." The reader will here observe that, in addition to copious bloodletting, Valsalva likewise enjoined upon the patient severe abstinence from food and drink, and the maintenance of absolute quietude in bed.

Hodgson remarks as follows on the same points:—

"The danger of inducing other diseases will, in some instances, forbid the employment of this debilitating treatment, or at least will prevent its being

carried to a sufficient extent to produce permanent benefit. With a view to obviate the probable effects of extreme depletion, it is desirable that the debility which it induces should not be continued longer than is necessary to arrest the immediate increase of the tumour, and that the force of circulation should subsequently be moderated by great tranquillity and attention to diet. The object of sudden depletion is to prevent the enlargement of the sac; the subsequent deposition of coagulum in its cavity is a slow and gradual process. In most instances, therefore, it will be sufficient to arrest the progress of the disease by depletion; when this is effected, the danger of inducing other diseases by the continuance of the debility, may be obviated by a diet nutritive in its quality, though small in quantity."

The same writer further says :—

"It is desirable that the bleeding should not be carried to such an extent as to produce fainting when the disease is situated in the aorta; for the blood is liable, during that state, to accumulate¹ in the aneurismal sac, and to form an impediment to the circulation when the action of the heart revives. I have known fainting, under such circumstances, continue so long as to excite considerable alarm. Morgagni² mentions an instance in which it terminated in death. The bleedings, therefore, should be small in quantity and frequently repeated so as to obviate this effect; for the same reason it is desirable that the blood be taken away in a small stream rather than suddenly, and through a large orifice. It probably was with this view that Pelletan³ merely opened the vein in one of his patients, and did not apply a ligature to the upper part of the limb so that the blood was allowed to dribble slowly into a napkin." (*Op. cit.*, pp. 160, 161.)

But while venesection, a spare diet, and repose of both body and mind together constitute the most powerful of all the means at our disposal for diminishing the force of the arterial impulse, there are also certain remedial agents in the shape of drugs which may be usefully employed in the treatment of aortic aneurism. Thus, Hodgson states that he has seen *digitalis* administered with a view to diminish the action of the heart and arteries, in the treatment of aneurisms, and in some instances with apparent benefit, more especially when the disease was accompanied, as is frequently the case, with dropsical effusions (*op. cit.*, p. 162). Dr. Crisp, however, thinks that it should be given with great caution in the aneurismal cases which are complicated with disease of the cardiac apparatus (*op. cit.*, p. 136).

In the fluid extract of *veratrum viride* we have a remedy that acts, when properly administered, with great promptness and certainty in diminishing *both the force and frequency of the heart's contractions*, and hence its great value in the treatment of many inflammatory disorders of a sthenic type. The writer is of the opinion that this medicine may also be advantageously exhibited in the treatment of internal aneurism. It appears to exert a much more prompt, certain, reliable, and controllable influence over the force of the circulation than *digitalis*, and, therefore, I think it

¹ Does not our author here mean to say that when venesection is carried to the extent of producing syncope, the blood is liable to *coagulate* in the aneurismal sac and thus, by means of *thrombus*, to offer impediments to the circulation? Such an explanation has at least the merit of being easily understood.

² Vide Letter XVII. art. 32.

³ Vide Clinique Chirurgicale (tom. i.) Deuxième Observation.

will be found more useful than that remedy in the treatment of internal aneurism.

Again, it is often necessary to administer palliative remedies with a view to procure relief from suffering in treating this disease. Dr. Crisp says, that in cases where much pain is present, the preparations of opium will afford the greatest relief; and, in some cases, large doses of this drug may be required. He mentions a patient of his, who suffered excruciating pain in the right arm and shoulder, but found great comfort from sprinkling the raw surface produced by a small blister, with the hydrochlorate of morphia. Belladonna and opiate plasters have also been found beneficial (*op. cit.*, p. 136). As we have elsewhere shown, the stomach in cases of either thoracic or abdominal aneurism is, from the compression of some portion of the nervous apparatus connected with that organ produced by the aneurismal tumour, not unfrequently affected with pain or distress (gastrodynia), flatulence, acidity, pyrosis, vomiting, etc. Such cases require the administration of antacids, carminatives, sedatives, and anodynes in order to procure temporary relief. Sometimes the administration of bismuth, or a solution of carbonic acid in water, or the chloroform mixture has been found very useful in such cases.

Reference has already been made to the applicability of the operation of Brasdor for the relief of internal aneurisms developed from certain branches of the aorta, such as the innominate, left carotid, and left subclavian, to which the primitive iliac should also be added. The importance of the subject seems to demand that brief additional consideration should be here given to this matter.

Now, it is well known that aneurismal tumours are not unfrequently developed from the above mentioned branches of the aorta, together, with the right carotid and right subclavian at the root of the neck, in such a way, with respect to size, shape, position, and relations, that it is impossible for the surgeon to apply a ligature to the artery between the aneurismal swelling and the heart, that is, to tie the vessel on the *proximal* side of the aneurismal sac in accordance with the principles of surgical treatment for that disease, which were enunciated, first, by M. Dominique Auel, a French surgeon, in the year 1710, at Rome, and, afterwards, with important improvements, by John Hunter, in the year 1785, at St. George's Hospital in London; and that the cases wherein the vessels affected with aneurism (spontaneous) cannot be operated on by the methods of Auel or Hunter, have, for the most part, been deemed incurable.

Brasdor, however, a professor in the School of Surgery at Paris, about eighty years ago, which was about the time that the operation of Hunter was attracting much attention, made the proposal in his lectures to operate for the cure of aneurism, by a new method, which consisted in the application of a ligature to the affected artery, on the *distal* and not on the *cardiac* side of the sac, as recommended originally by Auel. The proposal of

Brasdor was, however, first practised by Deschamps, in 1799, and was afterwards repeated by Sir Astley Cooper, but both cases terminated fatally, and the operation appears to have fallen into disuse, until it was revived by Wardrop, in 1825. This surgeon became the champion of the operation, and wrote an excellent treatise upon it, which was published in London in 1828, in which he shows that the operation of Brasdor is not of necessity fatal, that the cure is effected by it in precisely the same way as in the Hunterian operation, viz., by the coagulation of the blood in the aneurismal sac, and, finally, he points out the class of cases to which the operation is specially adapted; and it consists of certain forms of aneurism which cannot be operated on by the methods of Anel and Hunter, but can be by the method of Brasdor. He gives an account of four cases of carotid aneurism, seated at the root of the neck, and belonging to this category, which were operated on by the method of Brasdor. Of them two recovered and two died. One of the deaths, however, was occasioned, not by a return of the aneurism, or by hemorrhage, but by another disease. He also relates a case of aneurism of the innominate and root of the carotid arteries, which was treated successfully by D. Evans, Esq. by tying the primitive carotid; and he elsewhere points out as the reason why the operation of Brasdor is remarkably successful when performed on the primitive carotid artery, the fact that no branches of magnitude are given off from it between the aneurismal sac and the place of operation, and hence the blood is likely to stagnate and coagulate in the sac without delay, and the tumour also diminish rapidly in size. In his concluding observations Mr. Wardrop remarks:—

“The cases of aneurism in which the Hunterian operation is not applicable, are chiefly those of the carotid and subclavian arteries, of the arteria innominate, and of the iliac arteries, where the tumour is formed so near the heart, and has acquired such a bulk as to render placing a ligature on the artery between the tumour and heart an impracticable operation. It is in such cases, I conceive, that the new operation may be peculiarly applicable, a class which, from their formidable and hitherto untractable nature, have generally pursued a fatal course.” (*Wardrop on Aneurism and its Cure by a New Operation*, London, 1828, pp. 82, 83.)

An excellent account of this operation and the various practical considerations which are connected with it, may be found in *Erichsen's Science and Art of Surgery*, and in vol. iii. of *Holmes' System of Surgery*.

Why may not the medical plan of treatment be successfully combined with the operation of Brasdor for the cure of these aneurisms?

332 SIXTH AVENUE, NEW YORK, October 25, 1866.

ART. III.—*Trichiniasis*. By JOHN D. JACKSON, M. D., of Danville, Kentucky. (With four wood-cuts.)

By the observations of Zenker, in 1860, we have been enabled to add a new disease to the already long nosological catalogue, and what is certainly exceptional in medicine, coincidently with its isolation and description as an individual affection, we have a clear and demonstrable knowledge of its etiology.

The disease to which we allude is of parasitic origin, and has been called by its discoverer TRICHINIASIS, from the name of the entozoon producing it—the *trichina spiralis*. The generic portion of the name of the animal is derived from the Greek word *τριχίζ-τριχός*—a hair, in allusion to its filiform shape; the specific part—*spiralis*, from the Latin word *spiralis*, indicating the spiral, watchspring-like form it assumes when curled up within its cyst.

Though a knowledge of the malady to which the parasite gives origin is but recent, yet the existence of the animal and to a certain degree its natural history, had long been previously known. Hilton, of Guy's Hospital, London, in 1832, while dissecting the body of an old man who had died of cancer, observed the pectoral muscles to be thickly sown with minute white specks; he published his observations in the *London Medical Gazette* in February of the year following, and was thus the first to put on record a notice of what subsequently was demonstrated to be the capsules or cysts of trichinæ; if a doubtful observation by Tiedemann, ten years previously, of what has been supposed by some from his description to have been the same thing, be excepted.

Be this as it may, neither had a true knowledge of what he viewed, and the credit of the discovery of *trichinæ* must be given to James Paget, then a student at St. Bartholomew's, who, while dissecting a body early in February, 1835, and perceiving the muscles to be filled with what were supposed in the dissecting-room to be minute bony spicules, examined them with a lens and found that they were cysts, each containing a small worm coiled up in it. He was desirous of examining them microscopically, and for this purpose borrowed a simple dissecting microscope of Mr. Robert Brown, with which he was able to observe structures in the worm before invisible. As soon as the discovery was made known in the dissecting-room, portions of the muscles were distributed far and wide, and among others to the comparative anatomist, Robert Owen. As the discoverer of the entozoon, Paget was invited to communicate his observations to the Abernethian Society, which he did on the 6th of February, and an abstract of them was recorded in the *Transactions* of the Society.¹ On the 24th of the same month Professor Owen presented to the Zoological Society his

¹ Vide Letter of Paget to London Lancet, March 5, 1866.

memoir containing a "Description of a microscopic entozoon infesting the muscles of the human body," subsequently inserted in the Society's *Transactions*, and in the *London Medical Gazette*, April, 1835. This was the first publication on the subject, and in it Owen gave the animal the name which it has since retained—*trichina spiralis*. He, however, described the worm as destitute of intestinal canal and organs of generation, and classed it in a very inferior scale, among the helminthes. During the same year Dr. Farre published his observations upon a new subject in whom the trichinous cysts were found. He discovered an intestinal tube and organs of generation, which placed the worm in a higher rank of organization, and enabled him to assign it a place among the class nematoides (νῆμα, thread, and εἶδος, like). He also observed that the striated muscles, the heart excepted, alone contained the cysts. In May, 1835, Dr. Henry Wood, of Bristol, gave, in the *London Medical Gazette*, an account of a case of what he diagnosticated a violent attack of acute rheumatism complicated with cough and dyspnoea. The patient, a young man aged twenty-two, had been sick a fortnight, and confined to his bed six days previously to his being brought on the back of his father to the Bristol Infirmary, where he died on the tenth day after his entrance. An autopsy exhibited pneumonia in the first degree and extensive pericarditis; and upon examination trichinae were found in the muscular fibres of the chest and shoulders in great numbers, and in a less degree further from the thoracic region; "being most apparent in the pectoral and deltoid muscles, less so in those of the arm, and becoming still fewer in the legs. (Fritz.) The trichinae had not become encysted."¹

Though evidently now a case of *trichiniasis*, Wood was unable to detect the true cause of the affection, though in his paper he makes the very suggestive inquiry—whether in the subjects in which the trichinae described by Owen and Farre had been found, there had been observed any symptoms of rheumatism or inflammation of the muscles?

In the same year Harrison, in the *Dublin Journal*, placed on record six observations. In 1840, Kobelt and Bischoff published an account of an autopsy made at Heidelberg of a body infested with trichinae. Bischoff confirmed Farre's observations upon the anatomy of the worm, though he fell into the same error with him in mistaking the attenuated end of the animal for its tail, and consequently describing the mouth as the anus. He, however, pointed out the true character of the fatty granules situated so frequently at the polar extremities of the capsules, and which it seems had been mistaken by Owen for trichinous germs. He also declared the capsules to be made up of two distinct envelopes, an internal spherical, and an external ovoidal one, and observed, besides, the tenacious vitality of the parasites, which exhibited their movements at the expiration of fifteen days, when the muscles inclosing them had become completely putrefied.

¹ A. Farre. Observation on the *Trichina Spiralis*, Lond. Med. Gaz., 1835.

The development of trichinæ he could only explain by supposing a spontaneous generation. From 1842 to 1845 observations were published in this country by Drs. Bowditch and Jeffries Wyman,¹ of Boston, and in Copenhagen by Mönster and Soytzer.

During this time the origin of the worm was enveloped in mystery, Bischoff's theory of spontaneous generation in the mean while not being without supporters; Dujardin, in his work upon the helminthes, declaring — "l'apparition de ces *trichina* est encore un des plus puissants arguments en faveur de la generation spontanée de certains helminthes."²

This explanation, however, was rejected by most physiologists, who, with Virchow at their head, contended for the truth of the ancient aphorism, "omne vivum ex ovo," and supposed the worm to be the development of the egg direct, or the transition state of some other animal, which latter theory derived the strongest support from the discoveries then recently made by the Danish naturalist Steenstrup, regarding alternate generation or equivocal reproduction.³ Some additional colour was given to such supposition by the discovery of trichinæ in the cat in 1845, by Herbst. (Fritz.) The strongest support to the doctrine, however, was derivable from the discovery of trichinæ in pork (ham) in 1846, by Professor Leidy, of Philadelphia.⁴ This may be deemed the most important discovery since that of Paget,

¹ Boston Medical and Surgical Journal, 1842, 43, 44.

² Dujardin. Histoire naturelle des helminthes. 1845, p. 293.

³ The observations about that time published by Steenstrup are to the naturalist very curious, and exceedingly interesting. He found at certain periods of the year in the viscera of one of our fresh-water mollusks, the *Limnea*, a quantity of little worms with well-marked head and two posterior projecting limbs: these, under the microscope, were discovered to contain within the cavities of their bodies masses of other little worms recognized by the naturalist as young *Cercariæ*. The *Cercariæ* increasing in size would distend the worms containing them, which seemed to have for their office the protection and development of the *cercariæ* within them, and hence called the *nurses*. After growing to a certain size the *cercariæ* would leave the body of the nurse and move freely in the abdominal cavity of the mollusks; or, escaping into the water, fix themselves in turn upon the body of another mollusk, and dropping the tail, now no longer useful to them, be converted into encysted larvæ, known as *Distomæ*, and thus be ready to begin their transformation anew. The nurses in turn he demonstrated to be the offspring of little worms of another kind, termed *grand nurses*. These were supposed to be immediate offspring of the *Distoma*, the larval state of the *Cercariæ*; four generations and a metamorphosis being requisite to complete evolution—the parent animal finding no resemblance to itself in its progeny until it comes down to its great grand offspring. Among the plant lice (*Aphides*), the number of reproductions is still greater, for it is sometimes not until the eighth or ninth generation that the animals, previously asexual, appear as males or females. At this period the sexes are for the first time distinct, and the males provided with wings.—*Uide* Steenstrup's Alternation of Generations, Ray Society, 1845. Also Gould and Agassiz's Zoology, Chapter on Alternate and Equivocal Reproduction.

⁴ Proc. Acad. Nat. Sci., Phila., Oct., 1846, p. 107.

since by means of it a direct connection between the entozoon and the food of man was deducible. During several years succeeding, however, the researches seemed to be confined to the anatomy of the worm. In 1851, Luschka pointed out the attenuated filiform portion of the animal as its head, and further minutely described its structure, though he could not observe any genital organs, which were subsequently demonstrated, together with other points in its minute anatomy, by Leuckart, and Bristowe, and Rainey.

In 1855, Leuckart, Zenker, and Küchenmeister commenced experimenting upon different animals, forcing them to swallow human trichinous flesh. The experiments were but partial in their results, for some reason the muscles of the subjects of their experiments not being penetrated. From his experiments Leuckart nevertheless demonstrated the freeing of the trichinæ from their capsules, and a development, three days after entrance into the intestines, to thrice their primitive length; and from the previous discoveries made by Siebold, Van Beneden, and himself, upon the metamorphosis of the *Cysticerci*, came to the conclusion that trichinæ represented an inferior grade of development of *Trichocephalus dispar*, which error seems to have been generally entertained, until, by his experiments in 1860, observing the trichinæ to undergo complete sexual development and give birth to living young, he thus demonstrated the erroneousness of the opinion. Leuckart's observations had been made upon the dog, an animal which has been since found, as a rule, to be insusceptible to trichinous infection, though the worms will readily undergo development within the intestines and give birth to their young. He supposed that before transmission to man, possibly the young intestinal trichinæ must be ingested by another animal—a conclusion readily drawn by analogy from the result of the studies of the mode of propagation of tænia. With this view he gave a dog's intestines which contained trichinæ to a pig, an animal which he knew, by the observations of Leidy, to be susceptible of trichinization. By his experiments upon the pig and other animals he learned that the young trichinæ commenced their migrations from the intestines, when they were developed, toward the muscles, about the eighth day after the food containing them had been ingested, and that in the intestines of the hog, cat, rabbit, mouse, and barnyard fowl, trichinæ would attain their complete sexual development.¹

It was while Leuckart was in the midst of his experiments that Zenker made his ever memorable discovery, and sent a portion of the trichinous muscles of his patient to Virchow. This he fed to rabbits, and the results following were fully confirmatory of those arrived at by Leuckart. Says Virchow :²—

¹ Zeitschrift für Rationelle Medicin, III., R. VIII. Bd. 1860, 5 Mars. Quoted by Fritz in Gazette Hebdomadaire, 20 April, 1866.

² Virchow. Note sur la Trichina Spiralis. Comptes Rendus de l'Académie des Sciences, t. LI., p. 13, séance du 2 Juillet, 1860.

"It was upon rabbits that I was able to follow the development of trichinæ. Upon making a rabbit eat flesh containing trichinæ, the animal was seen to grow poor; in three or four weeks thereafter its forces diminished sensibly, and it died toward the fifth or sixth week which followed the ingestion of the food containing the entozoa.

"By this alimentation I have obtained five generations of entozoa. I at first made a rabbit eat living trichinæ occupying human muscle; it died at the end of a month. I then caused the muscles of the first rabbit to be ingested by a second; it died also a month after. The muscle of this served me to infect three others: two of them dying three weeks after, and the third at the end of a month. With these last I fed two others, one with much, and the other with but little of the flesh. The first died at the end of the eighth day without my autopsy revealing anything but an intestinal catarrh; the second succumbed six weeks from the time of performance of the experiment.

"With all of these animals, with the exception of the one before the last, all the red muscles, save the heart, inclosed a great quantity of trichinæ, so that each parcel examined under the microscope contained many, sometimes even a dozen."

Until 1860, although trichinæ had been so frequently observed in the human subject, as far as we are aware, if we except the case of Wood, there seems to have been no suspicion entertained of their hurtfulness, their presence and development having been investigated purely in the light of scientific curiosity.

It was on the 12th of January, 1860, that a young woman, a servant, aged 20 years, entered the hospital of Dresden. She had taken sick about Christmas, and had taken to her bed on the first of January. She had at first suffered with great weakness, heat, thirst, loss of appetite, sleeplessness, and constipation. When admitted into the hospital she presented, besides intense fever, a tympanitic and painful abdomen, the *tout ensemble* of symptoms, in brief, indicating typhoid fever. Very soon there appeared violent pains of the muscular system, pains such that the patient groaned day and night; then there was a contraction of the knees and elbows, rendering all efforts at extension impossible, so great was her pain; later there was œdema of the members, especially the legs, a typhoid pneumonia manifested itself, and finally, on the morning of the twenty-seventh of February, she died. Upon holding an autopsy Zenker found the whole of the striated muscles filled with trichinæ, which gave unmistakable signs of vitality in their active movements. To such a degree had they penetrated that a magnifier of low power exhibited as many as twenty in the field of the glass, the primitive muscular fascia had lost their striæ and were friable. There was no other lesion which could be attributed to typhus.¹

He also found male and female trichinæ which had undergone complete sexual development in the jejunum, together with a number of embryos.² On investigating the case, and tracing its origin, Zenker found that at the house in the country where the young woman had been serving as a domestic, there had been a hog killed on the twenty-first of December, which had been used as food by the family, and the ham and sausages made from it, he found filled with vast numbers of trichinæ, and, finally, that the butcher, who had killed the hog, and eaten of the sausages while fresh, together with many others, had fallen ill, though none ultimately succumbed, save the unfortunate woman who had been sent to Dresden. The persons

¹ *Vide* Kestner, Étude sur le Trichina Spiralis, p. 25. Paris, 1864.

² Fritz, Gaz. Hebdom., 20 Avril, 1865.

affected presented different symptoms more or less grave, which had been interpreted as gastro-intestinal catarrh, rheumatism, or typhoid fever, as the different phenomena predominated. The butcher's case was the one of most severity, and among other symptoms from which he suffered were pains and stiffness of the neck and extremities, which became, as it were, paralyzed, and which were supposed at the time to be an abnormal form of gout.

Zenker's observations being immediately reproduced by the medical journals, the attention of all Germany was at once directed to the subject. This terrible, and hitherto unknown source of disease, naturally placed every one on the alert, and since then to the present, counting isolated cases and *epidemics*, as they have not altogether inappropriately been called (for unfortunately from the nature of things, as it may readily be supposed, where the sources of infection exist, frequently a large number of persons become affected),¹ there have been published in Germany alone more than two thousand cases of trichinous infection. Among the most noted records may be counted that of the outbreak at Plauen and its environs, and published by Boehler and Koenigsdoerfer, there being between thirty and forty cases and one death. The account of a case at Heidelberg, by Friedrich,² Professor of Clinical Medicine, from the graphic relation of the symptoms, together with the apparent success of a remedy then for the first time tried, besides being the first case in which the diagnosis had been made and confirmed in an indisputable manner during life, attracted much attention in Germany. The epidemic of Magdeburg, Neustadt, and Buckau (1858—1862), described by Sendler, in which between three hundred and four hundred were said to have been ill. Those of Blaukenbourg, studied by Scholz and Griepenkerl³ (1859—1862), in which two hundred and seventy-eight cases were said to have existed, with one death in the garrison of the place, and a large number in the civil population. That of Calbe, described by Herbst and Simon, in which there were thirty-eight cases with eight deaths. The epidemic at Hettstadt, described by Rupprecht, the first having one hundred and fifty-nine cases with twenty-eight deaths; the last eight cases. And, finally, not mentioning a great number of smaller ones recorded, we have yet fresh before us, occurring in October of last year, the terrible epidemic of Hedersleben, the most widespread and fatal of any yet recorded, there having been three hundred and fifty cases, and eighty deaths.

As presenting lucidly the characteristic phenomena of trichiniasis we give Professor Friedrich's case in detail.⁴

¹ It is said that a single hog produced the outbreak at Hettstadt, and the terrible epidemic of Hedersleben was from two slaughtered hogs.

² Virchow's Archiv, 1862. t. xxv. p. 399.

³ Griepenkerl, in April, 1864, had one of the sufferers of 1859 to submit to a muscular exploration. He found numerous encysted trichinae, and thus fully confirmed a diagnosis founded on the history of the rational symptoms.

⁴ Étude sur la Trichina Spiralis, par H. Kestner, Paris, 1864, p. 26. Étude sur

George Mischler, a butcher boy, aged twenty-two years, well formed and enjoying excellent health, after having eaten of raw minced-meat made from pork, was seized, on the 14th of April, 1862, with an extreme lassitude of the limbs, and great pain in the muscles, especially the gastrocnemii. This he was inclined to attribute to a drinking bout during the evening. About the same time, and without any initial chill, he experienced headache, heat, thirst, abundant perspiration, and loss of appetite. The man wished to work, and continued to carry around his meat in the city, but he mounted the stairways with great difficulty, the symptoms of his disease continuing to become aggravated. Each day he passed a liquid stool without colic; the muscles of the arms, and the loins and back, became painful, but there was no vertigo, nor pulmonary trouble. At last, however, being greatly enfeebled, he desired to enter the hospital.

At the time of his admission, the 24th of April, he presented the following symptoms: Violent pains in the muscles of the extremities, and at the nape of the neck, which were increased by any movement, pressure, or even the touch. The muscles were turgid and elastic, yielding something of the sensation furnished to the touch by India-rubber. There was a stiffness and numbness of the members, with the articulations free and painless; he besides had a general feeling as if bloated (*d'enflure*). He could not sit up in bed, and if he made efforts to do so, experienced pain and stiffness in the inguinal region. Mastication, deglutition, and speech were perfectly intact. The abdomen was soft and painless. Neither the tongue, liver, spleen, lungs, nor heart exhibited anything particular. There was no bronchial catarrh, nor exanthematous rash. On the evening of the day of entrance, there was intense fever—visage red and hot, anorexia, tongue a little coated, feebly moist; urine acid, not albuminous; the pulse 108 pulsations per minute; temperature of the skin 106 F.

From the 25th to the 27th of April the same symptoms; the sleep was often interrupted, and there was slight delirium; two liquid stools without effort. The 28th, a feeling of profound weakness; pain in the muscles persistent, especially in the calves of the legs; slight epistaxis; two diarrhoeal stools. The 29th he passed some joints of tenia; sweated abundantly for an hour.

The 1st of May muscular affection continues; the patient can neither sit up nor turn himself in bed; elbows demi-flexed; great pain on an effort being made to extend the arm; the inferior extremities extended and immobile. Sweatings profuse and continuous, hoarseness commencing, a dry cough, no rale, pain in speaking, vertigo disappeared, intelligence clear. Heat and thirst less marked than on the day preceding, loss of appetite, urine for the first time albuminous.

The 2d, no change.

The 3d, feebleness increased; sweating abundant, following the profuse transpirations; there have appeared upon the neck, chest, and abdomen innumerable miliary vesicles, containing a clear aqueous fluid.

The 4th, the same state.

The 5th, sweating persisting; numerous minute pustules, containing a milky fluid, surrounded by a red areola, show themselves beyond the miliary vesicles, upon the chest and abdomen. The pulse is less frequent, beating 90 strokes per minute; the temperature of the skin has fallen to 100 F.

Friedrich having diagnosticated *trichinosis infection*, administered for the first time picronitrate of potash.¹ R.—Picronit. potas. 5j; ext. glyc. glab.; pulv. glyc. glab. aa qs; ℞. ft. pls. No. lx. S. Five pills three times daily.

May 7th.—Stiffness of muscles, contraction of arms, feebleness and sense of fatigue, hoarseness and sweating all continue; eruption extended over the whole of the back; head free; tongue normal; one yellow liquid stool; sleep and appetite good; no albuminuria. The same day, by means of Middeldorpf's² in-

les Trichines et sur les Maladies qu'elles déterminent chez l'homme par H. Seoutetten, Paris, 1866, p. 48. Translated from Virchow's Archiv.

¹ A double salt, composed of picrate potassa and nitrate of potassa—[C¹²H²(AZO)³OKO].

² A three-quarters explorer, terminating in a sort of harpoon, designed to bring up some muscular fibres, which are easily cut as the stem re-enters the sheath.

strument, a little morsel, scarcely the size of a hemp-seed, was extracted from the right gastrocnemius muscle, and upon being subjected to the microscope, seven trichinæ were counted, most of which were enrolled "*en spirale*," and interposed between the muscular fibrillæ. The picronitrate of potash is continued in the same dose.

May 9th. Movements less painful; the patient can, with some effort, sit up in bed; the resistance of the muscles is less, the contraction of the arms yet remains, but there is less pain upon effort being made to stretch them; the sweats persist day and night, and the last pustules extend over the body. A furuncle, the size of a pea, has formed at the inferior angle of the shoulder-blade; the skin has mortified, just beneath this point, to the extent of an inch and a half. In the pus of the furuncle there was found a large and well-developed trichina. Heart, lungs, liver, and spleen remain sound; stools normal. The urine has taken a deep yellow colour, under the influence of the picronitrate of potash, and the conjunctiva has commenced colouring; appetite returning. Ordered strong soups and a little roast meat. Pulse 84 per minute; temperature of body 100° F.

12th. Less pain of muscles, stiffness diminished, can almost straighten the arms; sweats continue, especially at night; œdema of limbs no longer present; marked icterus extending over the whole surface, from the use of the picronitrate of potassa.

13th. Can make a few steps in the ward; symptoms all improving. Epidermis detached in flakes from the toes and soles of the feet.

20th. Artificial icterus everywhere intense, pulse and temperature normal; the patient takes a warm bath daily.

25th. The picronitrate of potassa suppressed. A second exploration of the gastrocnemius by the harpoon furnished a free and living trichina.

29th. Continued improvement; the urine, which had become almost black, has returned to its normal state; appetite satisfactory. A renewed experiment from the same place gave a spirally curved trichina, living, and already inclosed within a thin and oval capsule.

30th. Icterus sensibly diminished.

June 15th. A new exploration did not furnish trichinæ.

30th. The patient quit the hospital completely cured, after an illness of two months and a half.

This case of Friedrich's was remarkable for being the first in which the diagnosis was confirmed during the life of the patient by extracting trichinæ. It was also the first in which this picronitrate of potash was used, and which, from the results *apparently* following, was, until further use of it demonstrated its inefficacy, deemed a specific. (Edema of the eyelids and face, which has since been found to be so constantly present as to be deemed one of the most characteristic symptoms of trichiniasis, is not mentioned either because so slight as to have escaped notice, or as is most probable, because the phenomenon, which usually sets in towards the close of the first week of infection, had appeared and subsided before the patient had entered the hospital.

As further exhibiting the clinical phenomena of the disease, we give the following cases observed by Böhler¹ and Kænigsdorffer.

Louise Schneider, servant, aged 22 years, of a delicate constitution, chlorotic, had been suffering some days previously with pains in her extremities, which were manifest about the 17th of March, 1862. In the mean time, there was great lassitude in the members, and a rather sudden swelling of the face.

¹ Böhler, Die Trichinenkrankheit und die Behandlung derselben in Plauen, 1863. Also, Scoutetten, Sur les Trichinose, and Kestner, from whom we translate.

Dr. Königsdorffer, her physician, after having lost sight of her for some days, saw her again on the 24th and could scarcely recognize her, so generalized had become the oedema.

The eyelids are markedly oedematous, as well as the extremities. Sweating continuous and abundant. The patient remains immobile in bed, the thighs and legs in a state of demi-flexion. The least movement occasions the most violent pains. Even the lightest pressure upon the muscles is equally painful. There is insomnia, cephalalgia, acceleration of the pulse, intense thirst, difficulty in opening the mouth, and protruding the tongue, which is moist.

Königsdorffer, having made his diagnosis, made at first an observation of the gums, but without finding trichinae. He repeated his trial four days after upon the biceps, and found for the first time living trichinae.

Calomel and jalap, with santonine, were prescribed plentifully with a view of acting against intestinal trichinae.

A peculiarity observed in the case was constipation and vesical tenesmus.

The symptoms, after having been intense, amended rapidly. By the 8th of April the oedema had diminished to a degree sufficient to permit the patient to walk a little, and by the 4th of May she was in a state to quit the hospital.

Caroline Nemmer, servant, aged 25 years, entered the hospital at Plauen, the 16th of March, 1862. The affection from which she was suffering had made its appearance eight days previously, by great weakness, anorexia, and a sudden oedema of the face which rendered the patient scarcely recognizable.

The symptoms present upon entrance were—face red, eyes injected, tongue red and moist; thirst intense; sweats; pulse 120; pains, and great lassitude in the arms and legs.

Diagnosis.—Rheumatismal fever. Prescribed aconite.

17th and 18th. Pains go on increasing; muscles of forearm seem tense and hard; the least touch and effort at movement increase the pains.

19th. The symptoms take on a mild typhoid character; cephalalgia, dryness of mouth and nose, insomnia, liquid stools. Morphia and emollient drinks now prescribed.

The following day, same symptoms, persistence of fever, insomnia and diarrhoea; the pains are general; oedema has appeared in the calves; sweating continuous and abundant. Prescribed morphia and ipecac.

It was only on the 24th, eight days after admission, that a true diagnosis was made, and which enabled M. Königsdorffer to discover the real nature of the epidemic thus prevailing at Plauen. This he had been enabled to do by having read an article giving an account of Zenker's case, the similarity of which to the unusual symptomatology of several cases then sick in Plauen, put him on the right track of observation. At this time, the oedema, at first limited to the extremities, had successively invaded the whole body. Arsenic was administered.

28th. The dropsy had become general; the pains were intolerable and rendered all movement impossible. The diarrhoea is complicated with a violent tenesmus; sloughing over the sacrum is commencing. Arsenic continued.

29th and 30th. Slight improvement, except the perspiration, which remains profuse. The typhoid symptoms are gradually disappearing.

April 1st. An increase of the anasarca; the epidermis is broken in different places. The general state is otherwise satisfactory.

2d. A first exploration is undertaken upon the biceps; it furnished free, living, well-developed trichinae.

A slow improvement going on. The arsenic is substituted by sulphur, then digitaline.

May 1st. The patient can lie upon his side, which facilitates the dressing of his bedsores.

7th. A pleuritic effusion, abundant on the left side, is manifest.

10th. A second exploration of the biceps yielded encysted trichinae in great numbers. Many cysts inclosed two, and even three.

On the 14th of July, although the pleuritic effusion had not been entirely absorbed, the patient demanded her discharge, after four months' sojourn in the

hospital. She had lost all her hair within the last few weeks; but at the time of going out, it was commencing to grow again.

Nearly two years after, Feb. 1st, 1864, the subject of this observation died, and M. Böhler found the muscles filled with living encysted trichinæ.

The cases given above may be deemed typical of *trichiniasis*. Though cases may differ more or less from each other individually, and certain symptoms assume a prominence in certain epidemics, or certain individuals, which may be lacking in others, yet taken in connection with each other, the disease may be said to be as well marked as almost any in the nosology.¹ The palpebral œdema may be deemed especially diagnostic. In the Plauen epidemic, just alluded to, so constant and marked was it that the common people designated those suffering from the affection by the expressive German word *Dickköpfe*.

The epidemic of Plauen differed from many others in most of the sufferers being constipated.

The fatal epidemic of Hettstadt, according to Rupprecht, in the beginning simulated cholera; and the recent and more fatal one at Hedersleben was mistaken at first for Asiatic cholera, so that it is said many persons fled to the country and died. (*London Med. Times and Gaz.*, Jan. 6, 1866.)

Until the true etiology and pathology of the disease was learned, the cases now known to have been trichinous infection seem to have been usually pronounced *gastro-intestinal flux*, *rheumatismal fever*, or *typhoid fever*, just as a certain variety of symptoms were prominent, or the medical observer, from any preconceived ideas, may have seized and dwelt upon any phase of the disease.²

Clinical observers have generally divided the phenomena attending trichiniasis under several heads, founding their divisions upon the pathological conditions presenting as the parasites progress towards their ultimate destination. We have—

1. *The period of gastro-intestinal irritation (stadium ingressionis, Rupprecht).* This period is comprised within the first week or ten days of the affection, and has its symptoms depending upon the irritation of the intestinal canal by the development and movements of the larval trichinæ of the food ingested. The severity of symptoms being dependent upon the amount of the food taken, the difference of time in the access of trouble after taking the trichinous viands—after making allowance for difference of temperament in patients—being explicable on the supposition of a difference of encapsulation of the trichinæ in different instances, in certain ones the covering being very thin and easily soluble, while in others, where

¹ It is said that Friedrich did not hesitate, in the case recorded, to make a diagnosis based on the rational symptoms, in the face of twelve cases of typhoid fever which simultaneously presented themselves.

² The epidemic of Magdebourg was described as an *epidemic of acute œdema of the subcutaneous cellular tissue (scleroma adultorum)*, and the one at Blaukenbourg as the *grippe*. Vide Sendler and Scholz, *Deutsche Klinik*, 1862.

the covering has undergone calcareous degeneration, a much longer time being required for the intestinal juices to act upon the envelope to a sufficient degree to liberate the worm. Most individuals do not suffer the first day after taking infected food. The sufferers of Hettstadt were usually taken within the first forty-eight hours after a repast, and most generally in the night, says Rupprecht, with vomiting, diarrhœa, and violent colic; the disease being marked by nausea, cardialgia, a fetid breath, eructations, and anorexia, a general feeling of *malaise* and great weakness, rigors and flashes of heat, a heaviness of head, and vertigo. In some cases the symptoms had all the intensity of cholera. The first period has nothing in it which might especially distinguish it from a case of gastro-intestinal irritation produced from any other cause.

2. *The period of muscular irritation (stadium immigrationis, Rupprecht).* This period is marked by an œdema of the eyelids and face, which, in the majority of cases, appears about the end of the first week. Occasionally it seems to have been absent, or to have been so slight as to have escaped observation, though these cases are certainly exceptional. Accompanying the œdema of the eyelids is a tension in the frontal region and at the root of the nose. The maximum of intensity is exhibited in lymphatic persons with a clear skin, especially girls and children, in whom the swelling invades successively the forehead, temples, and finally the whole face. The eyes become injected and watery, their movements painful, and very frequently photophobia and mydriasis exist. It is said that an ophthalmoscopic examination has exhibited the fundus of the globe, especially at the papilla of the optic nerve, as the seat of a characteristic œdema, and that the vessels of the retina are enlarged, and may be seen pulsating. There is also pain upon movement of the eyeball, and a diminution of the faculty of accommodation. Sometimes there is œdema of the tongue and glottis, or the cerebral meninges. The cellular tissue of the neck is hard and the veins swollen, which, by the stasis of blood thus produced, bring about the cerebral congestion. The hoarseness which is so commonly observed is produced by the immigration of the entozoa into the larynx; and, when the connective tissue of the pharynx is invaded to a great extent, there may be deafness from temporary closure of the Eustachian tube. The fever which has been lighted up about the end of the first week increases until the pulse ranges from 84 to 120 strokes per minute, the respiration 30 to 36, and the temperature of the body to 101 to 106° Fahr., as we saw in Friedrich's case. The bowels, if previously constipated, remain so; but if the affection set in with diarrhœa, it continues. The activity of the skin is great, the amount of perspiration being sometimes astonishing; the vesicular eruption which is frequently present being due to and in proportion with the amount of transpiration, as we know is the case with the sudaminal eruption in typhoid fever. The sweating is generally profuse for several weeks, and may continue in one part of the

body—sometimes a single arm—after it has ceased elsewhere. The phenomenon is explicable on the supposition of those parts being especially infected. The excessive sweating is generally supposed to be due to stimulation of the sudoriparous glands, from the hyperæmia resulting from the entozoa locating within the superficial muscles. The muscular contraction usually shows itself within the second week, and is the most marked symptom for the two or three following weeks. The muscles become swollen, hard, and painful, the patient suffering agony upon pressure or any endeavour being made to extend his limbs. The swelling is centrifugal, commencing at the roots of the members and extending to their extremities. The sense yielded to the touch by the muscles is compared to that furnished by caoutchouc. A tetanic rigidity is frequent in the muscles of the neck, back, and limbs; upon dissection of rabbits, Kestner found the temporal, masseter, and pterygoid muscles those most thoroughly infiltrated. Patients usually lie upon the back, unable to move, during the height of this period, and the agony endured renders sleep either impossible, or at best very much troubled. A peculiarity has been observed in children however, in strong contrast with adult cases, for they generally lie upon their sides, and sleep most of the time. About the third or fourth week, the diaphragm, intercostal, and other muscles of respiration becoming invaded, a greatly impeded action, followed by their partial paralysis, may ensue, ending in death. It is seldom that death occurs from this cause sooner than the fourth or later than the fifth week. In the gravest cases, about the fourth week frequently typhoid symptoms set in; there is in such cases a reaccession of fever, the pulse rises to 112 to 144, the respiration increases to 40 or upward. If constipation has previously existed, it is now succeeded by diarrhœa. The tongue becomes dry. The abdomen is tympanitic, and, in those instances in which a fatal result follows, there is involuntary emission of urine, a feeble, thready, rapid pulse, when finally delirium, carphologia, and hiccough close the scene. In the majority of cases, however, the fifth week marks the beginning of improvement. This may be deemed the—

3. *Third period, or that of convalescence (stadium regressionis, Rupprecht).* During this period there is usually a gradual improvement manifest, which is announced by a falling of the pulse and diminished frequency of respiration. When the fever is not diminished in intensity by the fifth week, it is generally because pleurisy or pneumonia sets in to complicate the case. On a subsidence of fever, the sweats diminish, the secretion of urine is increased, and sleep returns, while at the same time the patient can commence moving his limbs. The appetite, however, is usually slow in returning, and the feebleness is very great. It is about this time that we see a new œdema exhibiting itself, quite different from that of the second week, and which usually lasts not longer than from five to eight days. The œdema of this period commences with swelling at

the malleoli, and extends upwards, and not rarely assumes the proportions of general dropsy. The effusion at this stage is the consequence of anæmia, and it has been called by some authors the *period of anasarca or anæmic œdema*. It is during the sixth week that the patients begin to use their members, the extreme sensibility now disappearing. Yet, for some time, walking is described as very painful, from the extreme sensibility of the plantar muscles. During convalescence the hair falls off, as frequently the nails, and sometimes the skin is detached in large flakes.

Since 1860 the interest in the habits and development of the *trichina spiralis*, which up to that time was simply of a scientific nature, as naturally may be supposed, has been greatly intensified by the practical bearing lent to the subject by Zenker's discovery. Among the large number of investigators who have enlisted in the subject may be mentioned Virchow, Leuckart, Küchenmeister, Leisering, Haubner, Kestner, Scoutetten, Turner, Davaine, Tommasi, and especially Pagenstecher and Fuchs.

We would give a *résumé* of their observations by saying: The trichina is from 0^{mm}.15 to 3 millimetres in length, and 0^{mm}.03 to 0^{mm}.05 in thickness.¹ When in the larval or encysted state, it is asexual (Fig. 1), but on being taken into the stomach it undergoes full development, the female (Fig. 3)

Fig. 1.

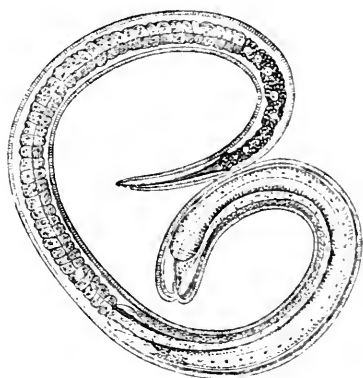


Fig. 2.



FIG. 1.—A muscular trichina, after complete development. M. E. Gros-Renaud. Magnified 320 diameters.

FIG. 2.—An intestinal trichina, grown male, with generative organs exhibited at tail. Magnified 150 diameters.

¹ Vide Kestner, pp. 22, 23. Pietra Santa, La Trichina Spiralis D'Owen, Paris, 1866, p. 9: gives 0^{mm}.8 a 1 millimetre. Dalton, Observations on Trichina Spiralis, Transactions N. Y. Acad. of Med., 1864, gives length $\frac{1}{8}$ inch, breadth $\frac{1}{100}$ inch.

being of greater length than the male (Fig. 2), and always being found, in proportion to the latter, in much greater numbers, by some observers it

Fig. 3.

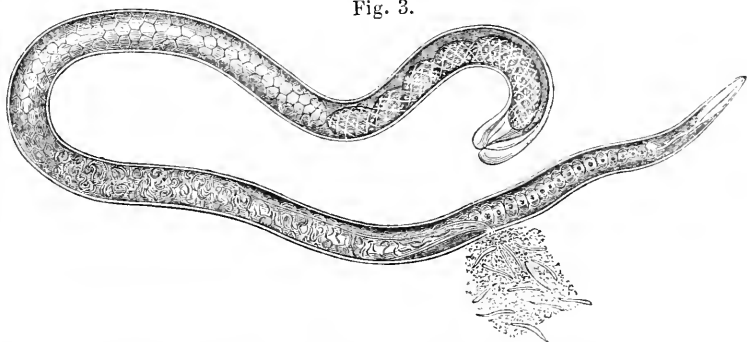


Fig. 3.—An *intestinal trichina*, grown female, full of eggs and embryos, a number of which are seen escaping by the vulvar orifice, situated and opening towards the head of the animal.—KESTNER.

having been seen to be seven or eight times as numerous. Besides an alimentary canal, the female has an additional tube opening towards the mouth, which latter is situated at the most attenuated end of the worm, contrary to what the early observers supposed. This tube is the receptacle for its eggs, which are developed within her previous to extrusion; the animal is consequently viviparous, and produces according to Virchow 200, to Gerlach 400, and according to Leuckart 1,000 embryos. The young thus born, as stated above, are without sex. It would seem that reingestion by the stomach or bowels is necessary to their development, for if they remain in their encysted state, they ultimately perish. Immense numbers of them may be found within a very small space. Dalton observed twelve trichinæ in a piece of muscle the one-twelfth of an inch square and one-fiftieth of an inch thick, which would give 7,200 to the square inch; and we ourselves have, in a piece of muscle weighing one-tenth of a grain, been able to distinctly count 11, giving thus 52,800 to the ounce; a few mouthfuls of food infested at such a rate would afford females enough to generate millions.

The parent trichinæ, after giving birth to their young, are expelled from the intestines. About a week, usually, after trichinous food has been taken into the stomach, the young animals have been hatched, and commence boring into the walls of the intestines, though Fiedler's experiments upon rabbits show that the trichinæ may become sexual during the second or third day, and the embryos quit the mother to commence their peregrinations on the fourth day. They seek the striated muscles as their destination.

A number of observers have supposed that the young worms reached their ultimate habitat by the torrent of the circulation. Dr. Dalton expresses himself as of that opinion, and in some observations was led to conclude that the cysts were formed within the walls of the capillaries.

He thinks the œdema of trichiniasis lends confirmation to his observation, which, he says, "it would be very difficult to explain on any other supposition, but is easily understood by an arrest of the circulation taking place simultaneously in so many capillary bloodvessels as must necessarily be obstructed when 7,000 trichinæ are contained within the space of a cubic inch."¹

The great mass of observers, however, and Virchow and Leuckart among them, believe the parasite to work its way to its destination purely by vermicular action. In confirmation of their opinion is the fact that we have no recorded observations of the animal being found in the blood. Reaching the muscles, they commence undergoing encapsulation, the capsules having their long axes ranging parallel with the muscular fibrillæ.

Fig. 4.

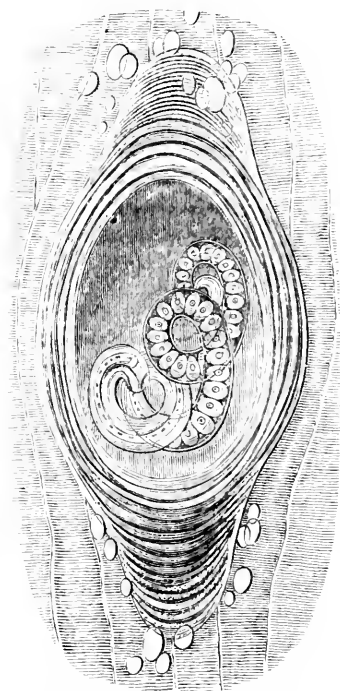


Fig. 4.—A cyst, around the poles of which fatty granules have commenced depositing. Photographed by M. E. Gros-Renaud, under the supervision of Kostner. Magnified 300 diameters.

The attachments of the muscles, where the muscular fibrillæ become converted into tendon, seem to furnish an obstruction to their progress, for it is here that they are found to be encysted in the greatest numbers. As said, the striated muscles—the heart excepted—are their seats of election. They have not been discovered in the brain, liver, kidneys, bladder, or in the fat. Usually but a single worm is contained within a cyst, though occasionally two and sometimes three are found. As time advances, the capsules become thickened and hardened, minute fatty globules are frequently found deposited around the two polar extremities (Fig. 4), and in time the whole cell seems to undergo calcareous degeneration. After encapsulation, the entozoa no longer produce trouble, consequently patients who survive encystment very generally recover. It has been noticed that, after recovery, patients frequently become excessively corpulent.² When encysted, the worm remains in its dormant state, or hibernation, so to speak, until the death

¹ Observations on *Trichinæ Spiralis*, Trans. N. Y. Acad. Med., p. 15.

² Althaus, in speaking of Hilton's subject being cancerous, and Langenbeck and Blasius each operating upon a trichinous subject for cancer, suggests cause and effect as existing between the two affections. We notice another by Von Thaden, and a recent case of cancer in a trichinous patient operated on by Middeldorpf.

of its host, when, if chance favours its entrance into the stomach of another animal, it commences anew its cycle of development, otherwise it perishes. Scoutetten gives a case where the muscle of a subject, who had been infected thirteen years previously, promptly developed and gave forth young upon being swallowed by a rabbit; and in the *London Medical Times and Gazette* for June, 1866, is the record of a case from *Virchow's Archives*, in which living trichinæ within calcareous capsules were found in a patient who had been trichinosed twenty-four years previously.

In 1864, Pagenstecher, aided by Fuchs, devoted nine months to experimenting on *Artificial trichinization* upon animals of various classes, viz: Mammifers; birds; cold-blooded animals: amphibia, fishes, mollusks, and even insects.

Among the *Mammifers*, they studied first the domestic, then savage animals, and of the former class, the *dog* was the first subject of observation. They found, as Virchow, that trichinæ within the intestines of the dog would undergo development and propagate, but that they would not penetrate the intestines and enter the muscles. One or two other observers speak of having infected dogs, but the cases were certainly exceptional, and it has been thought that the entozoon producing infection, was of another species than the *trichina spiralis*, as has been found in the case of the mole. The *cat* is easily infected, and the *rabbit* more so. All efforts to trichinize a *he-goat* were unavailing, though he was made to swallow large quantities of the infectious viands during several weeks. The *she-goat* was very difficult to infect, though this could sometimes be done. The *hog*, as before known, he found excessively easily infected. The *calf* was found susceptible of infection. One was experimented upon which was exclusively fed upon milk; it was fed for several days upon rabbit flesh containing, as calculated, about 70,000 trichinæ. It was killed 19 days after, and the intestines were found to contain a great quantity of trichinæ, and a part of them had already commenced their migrations into the muscles. The *bull*, *ox*, and *cow*, were tried, but, although some of the trichinæ were developed and gave forth young, none of them penetrated the muscles. The *sheep* could be trichinosed, though with difficulty.

On experimenting upon *wild animals*, it was found that in the *fox*, a similar result took place to that which happened with a dog—the trichinæ, developing in the intestines, but then dying. The *wild boar* was as easily trichinized as the domesticated porker; *stags*, and *roe-bucks* were susceptible, though the infection was produced with difficulty. *Guinea-pigs*, a few days after ingestion of trichinous food, evinced symptoms of great suffering, and died within eight or nine days. The *hare* seemed a little more difficult to infect than the rabbit. *Mice* died about ten days after ingestion of the food; *rats* resisted infection a little more than mice. As to *badgers* and *martens*, the question remained doubtful.

In *birds*, they never succeeded in the production of muscular trichiniza-

tion, though they experimented with the barn-yard fowls, the *cock*, the *hen*, the *goose*, the *turkey*, and the *pigeon*, besides the carnivorous ones, the *starling*, the *crow*, the *jackdaw*, the *jay*, the *peacock*, and *turkey-buzzard*. The entozoa increased and became sexual, but were expelled by the alvine evacuations; in the *magpies* no trace of intestinal trichinæ could ever be found four days after swallowing the meat.

In *fish*, especially the *carp*, which eat trichinous meat readily, the trichinæ never underwent development. In the *amphibia* the result was the same, the experiments having been made upon *frogs* and many species of *salamanders*. In frogs sometimes the trichinæ had left their cysts, though development was never observed to have proceeded farther. Once in the heat of summer, July 22d, a male trichina was found in the intestine of a *triton*.

Among the *crustaceæ*, the *crab* alone was experimented upon; the result was negative.

Among the *insects* fed, were *flesh-flies*, and *beetles*: the organs of the former were never found to contain trichinæ, though among the beetles the *Dytiscus Marginalis*, five days after eating the food, was found to contain living trichinæ within its stomach.

They give as the result of their conclusions, that of all the animals which come to our table we need fear trichinous infection from the hog alone. Dr. Percy, of New York, has recently given a case occurring under his observations, in which beef had infected a family, and which upon examination was found to have trichinæ in it, though in nothing like such numbers as he had found in pork. Simon cites the cases of two patients who were trichinosed by beef in the epidemic of Calbe; Rupprecht reports two others in the Hettstadt outbreak, and subsequently the falling ill with trichiniasis from eating raw beef, of six persons during the epidemic of Leipsic. These contradictions to the observations of Pagenstecher and Fuchs, as also the experience of Lenckart, who fed 1220 grammes of trichinized pork to a young beef which he killed at the expiration of two months, and could find no trichinæ within the muscles, it has been attempted to remove by saying that the beef had been cut with the butcher's shearing-knife and had laid in contact with trichinized pork in the stall. Dr. Percy was informed by the butcher that the beef in question in his case had been fattened at the distillery stables at Newton, Long Island. Even admitting the possibility of trichinizing beef, doubtless it is so rarely infected, and then through accidental circumstances in the way of unnatural feeding or otherwise, that it need not much be feared. Our real fears should rest with pork, and with this view, attention has been especially directed to the food of the hog, to find out if possible what may have been the original source of infection. Professor Schacht, of Germany, discovered in the beet-root—a regular article of food for swine in that country—what seemed to be trichinæ, a minute kind of worm inclosed in cysts; and hence this was thought at the time

to be the prime source of infection. Stein subsequently examined with care these supposed trichinæ, and found them to be of an entirely different character from *trichinæ spiralis*, confirming in full an antecedent observation of Virchow, and which received further confirmation by Dr. Kuhne, of Halle.¹ Prof. Langenbeck thought that the earth-worm was naturally infested by trichinæ, asserting that he once found between 500 and 600 in a single annelida. It has been proved, however, that he was in error, and that as in the case of Schacht, the parasite belonged to a species in every respect different from the trichina.² The mole, according to Herbst, is more generally found trichinosed than any other animal. Virchow and Leuckart doubt the identity of the entozoon with the *trichina spiralis hominis*.

All experiments upon the encysted muscular trichinæ coincide in demonstrating their extraordinary tenacity of life. Leuckart submitted trichinous flesh for three days to a temperature of thirteen degrees below zero F., after which he fed it to a rabbit, which died trichinosed at the end of four weeks, and it has been ascertained that they will bear, for a time, with impunity, a temperature up to 169° F., but heated above that point they are infallibly destroyed. (Kestner.) Tomassi says that they can be vivified after desiccation. (Pietra Santa.) Hertwig boiled trichinous meat, cut in slices the size of one's thumb, for twenty-two minutes without killing the trichinæ, though a continuation of the boiling three minutes longer destroyed them. Virchow demonstrated the difficulty of destroying them by soaking trichinous meat in a solution of chromic acid so strong as to coagulate the muscular tissue, and yet after eight days of digestion, on denuding them of their capsules, they showed by their movements that they had not been injured. It has been asserted that salting may be relied upon as a destructive means. Accurate investigations demonstrated that the effect of salting is so uncertain that it cannot be relied upon; a person has been infected by pork which had been submitted to a salting of thirty-five days.³ Smoking is equally doubtful.⁴

With a view to the destruction of trichinæ while in the intestines, a great many experiments have been made upon muscular trichinæ with medicinal substances, and observing their power of resisting the effects of them. The picronitrate of potash, from which so much was expected after Friedrich's cases, has been demonstrated by Fiedler and others to be of no avail. Mosler demonstrated that trichinæ were killed after thirty hours immersion in rectified oil of turpentine.

¹ Vide Gazette Hebdomadaire, 9 Mars, 1866.

² This discovery was deemed so important, that the Prussian Minister of Agriculture made a request of Dr. Kuhne to examine the question; which he did, and came to the same conclusion as Virchow and Gerstoecher, who placed the parasite in a different class.

³ Scoutetten.

⁴ Gaz. Hebdomadaire, 18 Mai, 1866.

That they could resist pure chloroform about five hours.

They were found by him alive after an immersion of thirty hours in Fowler's solution of arsenic.

They were found living after lying for forty-eight hours in a mixture of two grammes of santonine, and eight grammes, each, of olive and castor oil.

Extract of male fern four grammes, and fifteen grammes, each, of gum arabic and distilled water, did not destroy them in thirty hours.

A strong decoction of pomegranate bark gave the same result.

In iodide of potassium two grammes, and water thirty grammes, they were living at the expiration of thirty hours.

In a solution of carbonate of potassa eight grammes, and distilled water thirty grammes, they ceased to live beyond twenty hours.

Colberg found a concentrated solution of chloride of sodium to kill them within a quarter of an hour; and Rupprecht at the end of two hours; though, as Fritz remarks, how can we deem kitchen salt an antidote, when we have salted meat, and especially ham, so frequently communicating trichiniasis.

The only reliance against infection by trichinized meat seems to be to raise it to a temperature above 170, at which point the albumen in the tissues of the worm will become coagulated, and the parasite thus be certainly destroyed.

It is a little singular that trichiniasis seems to be almost entirely confined to Northern Germany and Prussia. But our wonder ceases when we come to learn of the culinary habits of the population, and we are no longer astonished at such outbreaks as those of Hettstadt and Hedersleben, when we know of the common German custom of eating *rostewurst*, after only twenty-four hours smoking: and when we learn that butchers when cutting up mince-meat are not unaccustomed to eating titbits raw from the block.

The population of the French departments bordering on Germany consume pork derived from the same source as that used by the Germans, but only after being well cooked. Trichiniasis among them is unknown, while with their neighbours it is prevalent. So terrible has the affection become to the German people, that in several of the principalities the sale of pork is illegal, until it has been inspected microscopically, and branded by constituted authority. Recently, the French Government, alarmed by the fearful sufferings experienced in Germany, deputed M. Delpech, of the Academy of Medicine, and M. Reynal, of the Veterinary School at Alfort, to proceed to Germany to study the affection and report upon the propriety of requiring inspections previous to the sale of pork within the French empire. The result of their observations was the opinion that the German people's sufferings were entirely due to the habit of not properly cooking their food, and that as long as the present mode of preparing pork for the table in France should continue, the danger of infection was nil, and that consequently inspections were unnecessary.

As a result of the compulsory inspection of pork in Germany, some knowledge of the proportion of trichinous hogs to those free from infection has been gained, and it has been found to vary very much in different localities, *e. g.*, at Brunswick, according to Otto Muller, since the 1st of Dec. 1863, 19,747 slaughtered hogs have been inspected, with the result of finding but 2 which were trichinized. At Blankenbourg, from 21st of Oct. 1864 to 21st of Oct. 1865, 700 hogs were examined microscopically, 4 being found trichinized. At Zinton, of 45 hogs examined, by M. Risse, 3 were discovered to be trichinized. And at Fulda, 1 hog in 412 contained trichinæ.

The *trichina spiralis* does not seem to be confined to Europe, but observations recently made in Chicago show that some sections of North America would seem to have the swine inhabiting them as frequently infected as any part of Germany. By Scontetten's account, the entozoon is also found in South America. He relates the case of a ship coming into Hamburg from Valparaiso, Chili, with several sailors sick, two of whom died in hospital with the symptoms of trichiniasis, and the muscles of one of whom were examined, and found infiltrated with living non-encysted trichinæ. Upon tracing the malady to the source of infection, it was found that a hog had been bought at Valparaiso, and subsequently killed aboard ship, and that its flesh, a part fresh and part salted, had been a portion of the sailors diet: upon examining with the microscope a piece of that which had been salted away, it was found infiltrated with trichinæ.

In the United States, thus far, there have been but few cases of trichiniasis recorded. The first, of which we are aware as being diagnosticated as such in this country, were those occurring in the practice of Dr. Schnetter, of New York City, in Feb. 1864, in the case of a German family who had been eating raw ham, which upon a microscopic examination, made subsequently, was found filled with trichinæ, and which resulted in the dangerous infection of the whole family, and the death of one of its members. Dr. Voss, a short time subsequently, was called to see the captain, first mate, and cook of a Bremen ship, then lying ill in the harbor of New York. The symptoms were of an anomalous kind, but such as to induce Dr. Voss to suspect trichinous infection. To satisfy himself, he cut down upon the deltoid muscle of the second mate, and upon removing a portion of its tissue and subjecting it to the microscope, by the calculation of Dr. John C. Dalton, who examined a piece given him by Dr. V., it contained a little over 7000 trichinæ to the cubic inch. Dr. Lothrop, of Buffalo, has also reported a case. Recently in Linn County, Iowa, we have an account of 9 persons in a family eating raw ham, with the serious illness of all of them, and the death of five.¹ The cases thus far recorded in

¹ *Vide* Med. News, and Library, July, 1866.

this country have been nearly all among the foreign population among whom the custom of eating raw meat prevails.

Dr. Leidy says that the inhabitants of the United States appear to be less infested with entozoa than those of any other part of the world, and accounts for it by the fact, that an abundance of wholesome food being at the command of the poorest labourer, there is produced a high organic activity which is unfavourable to parasitic development. He gives the cooking of food, by destroying the germs of parasites, as the reason for man, notwithstanding his liability to the latter, being less infested than most other mammalia; and very pertinently asks: "Did instinct originally lead him to cook his food, to avoid the introduction of parasites?"¹

Be this as it may, if the promptings of instinct are not sufficiently strong within us, the teachings of science of the last few years ought certainly to lead us in future to eat our pork well cooked.

DANVILLE, KY., August 7, 1866.

ART. IV.—*On Retrogressive Motions in Birds produced by the Application of Cold to the Cervical Spine, with remarks on the use of that Agent as an aid in Physiological Investigations.* By S. WEIR MITCHELL, M. D.

AT long intervals during several years, I have made use of various degrees of cold as means of research in experiments upon the nervous system, and, especially, its central ganglia.

Until recently I have been unable to control it, so as to secure from its employment all the advantages which at one time I was led to look for.

Of late, however, the interesting and valuable method of causing local anæsthesia by cold, invented by Dr. B. W. Richardson, of London, has enabled me so to improve upon the plans which I formerly followed, as to lead, in one direction, at least, to results of the utmost interest, and I believe of entire novelty.

Were my time completely at my own disposal, I should have preferred to wait until I had developed and explained these results more perfectly to my satisfaction. Unfortunately I should have been obliged in this case to await the return of another summer, and I have therefore thought best to lay before my fellow-workers, in this branch of science, the conclusions already attained; trusting to them and to my own future labours to complete what I have in part effected.

Various methods have been made use of to study functions by injuring or destroying the organs to whose integrity they have been supposed to

¹ A Flora and Fauna within Living Animals, Smithsonian Institute, 1851.

owe their existence. For this purpose mutilation or ablation has been employed. In other cases poisons have been given to abolish for a time the action of those portions of the centres or nerves upon which certain drugs have been thought to exert an influence. This latter mode is even more uncertain than the one about to be proposed, and has besides obvious inconveniences upon which it is hardly necessary to dwell.

During the spring and summer of 1863, Dr. Morehouse and I engaged in a prolonged research on the cerebro-spinal fluid, and the influence of pressure in producing convulsions. In the course of these experiments the following observations were made. As I was led by them to engage in the experiments which are the subject of the present paper, I think it best to copy them at length from my note-books. I am the more willing to do so, since they possess an interest in themselves, and are, I believe, rather novel in character.

Experiment 1.—June 6th. Large rabbit, cut down in middle line, and made a minute opening through the membrane which fills up the occipito-atloid space.

A tube twelve inches long, and two millimetres wide, open at both ends, was drawn to a point at one extremity, and expanded funnel like at the other. The lips of the small end were rounded carefully and made to flare outwards a little. This extremity was then slipped through the hole in the membrane which it accurately closed, when drawn gently outwards, so as to bring the flange of the tube against the inside lip of the opening. The tube was then held upright, and water temperature 66° F. was poured into its upper end. It was possible in this manner to pour into the tube, and through it, into the spinal canal, at least *half an ounce* of fluid. At a certain point, usually when there was a pressure of ten inches in the tube, convulsions ensued and checked the experiment.

The injection thus made, displaced the blood in the spinal vessels, and caused bleeding from any exposed veins of the cord or head. Died next day. Medulla oblongata softened.

Expt. 2.—In two rabbits we repeated this observation, injecting water at 100° F., when the largest amount was borne before general convulsions took place.

Water at 120° F. Less pressure was borne and convulsions came sooner. When water at 32° F. was employed we found that the spasms followed almost instantly upon the introduction of the first few drops of fluid.

The convulsions which ensued were very remarkable. The animal rolled, turned, leaped, shivered, and in fact exhibited every variety of convulsive action in remarkable perfection. This effect seemed to be due to the direct influence of cold on the medulla oblongata, since like effects were produced when a morsel of ice was laid gently upon that organ, or when it was exposed and iced water was dropped upon it.

This very striking experiment led me at a subsequent time to test the possibility of suppressing the functions of central ganglia by the use of cold.

It is scarcely necessary to do more than allude to the attempts which I made to effect this end. At intervals, during the summers of 1863 and 1864, I made many applications of ice, and ice and salt in bags, to the spines and brains of rabbits, Guinea-pigs, and kittens. Nearly all of these experiments failed to give striking results. In some cases, as where I tried to freeze the part without removing the overlying tissue, no marked phenomena ensued. In others, where I placed the freezing mixture on the bony spine itself, or on the head, feebleness alone was produced. In no

instance did I make use of birds until the spring of 1866, from which time my present experiments date.

At the period last referred to, it occurred to me to try whether Dr. Richardson's application of the atomizer to local anæsthesia might not enable me to effect the purpose in which I had previously failed. I also reflected that birds might answer better than quadrupeds, on account of the thinness of their skulls, and the comparative isolation of some of the central organs—such as the cerebellum, and the optic tubercles. On the other hand, birds offered an embarrassment in the high temperature which their bodies present, and which, of course, makes it difficult to freeze any portion very deeply. The heat of the pigeon, for example, is frequently nine degrees above that of man.

Notwithstanding this drawback, the change in the animal used, and the employment of Richardson's method enabled me for the first time to get satisfactory results. Among the most striking were those which I obtained while attempting to freeze the necks and heads of pigeons, and it is these which I propose here to relate at length.

The method in this research was much the same in every case, and will exact very little description; Richardson's atomizer was necessary when ether was used. In general, however, rhigolene was employed with the aid of a cross jet of air—such as is made use of in atomizing water. This is mentioned particularly because the form of apparatus which is best for ether does not answer so well with rhigolene.

In some instances the atomized fluid was thrown upon the skin, in others on the bony case of the nerve-centres, and more rarely on the nerve substance previously laid bare, or merely guarded by a thin patch of caoutchouc. The animals employed were pigeons, chickens, rabbits, cats, and frogs.

Expt. 3.—June 29, 1866. I threw a jet of rhigolene upon the back of a pigeon's head. The time not stated in my notes. He shivered towards close of freezing. When released he walked away, shook himself, cleaned his feathers and bill, etc. In one minute he began to move backwards suddenly, as if by his own will. Before each motion of this kind he squatted close to the floor, and as he began to move, threw his tail up and his head down, and to one side. The series of motions had the appearance of a spasm. In the intervals he sought a corner, and sank into a stupid condition, or else walked about as usual until either a backward motion overtook him, or he fell anew into stupor. From this he was easily aroused, and was then to appearance in full possession of all his faculties. The backward movements at length became visible only as sudden checks which overtook the pigeon now and then while walking forwards.

This experiment offered certain novel and curious facts. The delay before any noteworthy phenomena were seen, the sudden onset of a strange form of convulsive movement, the state of partial stupor apt to follow, and finally the healthy appearance of the animal in the interval, reminded me of the symptoms of certain epileptic cases, and made me hasten to repeat the observation.

Expt. 4.—Same pigeon frozen two minutes a little lower down, so as to more exactly influence the cerebellum. Released, he walked away well and strong.

pluming himself, and picking his breast, a common motion. Within twenty seconds the first backward motion took place; at the same time an increasing difficulty of movement overtook him. He walked as if drunk, lifting his legs very high, in a curious fashion. Five minutes from the freezing he still had frequent backward motions, which gradually lessened. At the tenth minute he began to exhibit the attacks of stupor.

Expt. 5.—Used rhigolene over the cerebellum of a young pigeon for about four minutes. Released, he could not stand, but rocked to and fro, and threw himself from side to side with general movement of all the muscles, but no orderly execution of any series of movements. Second minute, ran forward naturally for the first time; tried to fly through the window, and uttered the cry common to young pigeons. At the third minute he began to turn somersaults backwards, and did so for half a minute, when he stopped a moment, and again continued to turn over backwards. Then came a period of stupor, broken at the fifth minute by continuous backward turns. He still cried at intervals, and the somersaults gave place to backward movements which were very rare, when, at the ninth minute I ceased to observe the bird. Three days later the pigeon was perfectly well, except that he had a small slough over the most prominent point at the back of the skull.

Up to this time I had seen nothing very novel, excepting the temporary creation of spasms, such as in some shape were known to occur when the cerebellum was mechanically injured. The following experiment opened a newer field:—

Expt. 6.—A pigeon whose cerebellum had been previously frozen many times was chilled on both sides of the neck during one minute by a double jet of rhigolene, at the level of the tenth cervical vertebra, just above the junction of the neck of the body. When released, he became at once the sport of violent general convulsions. They were very complete, and offered no other striking character for a few moments; then there were occasional backward somersaults, or an effort in this direction. At the second minute the backward walking motion began to be seen, as the general spasms and the somersaults ceased. The stupors also appeared, and alternated with the runnings backward until within an hour the animal gradually recovered its usual health.

If the results above noted had followed the chilling of the cerebellum only, I should have been little surprised; but nothing in our previous knowledge of physiology led me to look for general convulsions or backward spasms from injury to the spine below the medulla oblongata. After witnessing this remarkable result I repeated the experiment again and again upon a number of pigeons, with precisely the same results, sometimes obtaining backward somersaults, and at others only retrograde movements, alternating with periods of stupor and intervals of apparently full control of all the normal movements.

At another part of this essay I shall describe more minutely the character of these abnormal motions. At present I pass on to consider the limits of the region which, being chilled, will give rise to them. I began at the cerebrum and made the following experiments, which I briefly state:—

Expt. 7.—Pigeon previously frozen several times, but now perfectly well. Rhigolene spray on skull over cerebrum for four minutes, guarding the cerebellum with a card, and also preventing, in a similar way, all inhalations of the vapour, a precaution which was taken whenever the freezing was near to the head. Released at 6.44½. His head rolled about a little. His general movements

were uncertain, and he walked away, seeking a corner. One and a half minutes. Continuous backward somersaults, with short intervals of rest and stupor. Sixth minute. Same phenomena. Observation ceased.

Expt. 8.—Rhigolene on cerebral region three minutes. Pigeon in a state of profound sleep or stupor. Third minute after freezing, head falls, eyes closed, weak, falls sideways, but soon tries to walk and seeks a corner. Fourth minute, stupor, roused by falling over. Occasional spells of like nature, but less marked, and further apart. No backward movements at any time.

Expt. 9.—Exposed cerebral lobes of pigeon; no bleeding; drew skin together over the brain, and threw rhigolene jet on it for one minute, freezing it as hard as ice. Set free, he flew straight up into the air one or two feet, again and again for three minutes; then had spells of vehement forward movement, during which he stumbled, with his neck bent forward, eyes shut, not directing his steps, and running against any obstacle put in his way. In four minutes he became more conscious, tried to fly out of window, and suddenly fell into stupor, from which a push aroused him. Eighth minute. Backward walking spasms for eight or ten steps at a time, varied with stupor. Nearly well at twelfth minute.

Expt. 10.—After an hour froze the exposed cerebrum of same pigeon one and three-quarter minutes. Asleep; awakened somewhat in ten seconds, and had slight general convulsions. First minute, intense forward flexion of neck. Attempting to move forward he falls on his side; alternate sudden forward rushing motions and backward walkings, the latter predominating. Fifth minute. Backward motions only, but well marked. Recovery at seventh minute.

In these and similar experiments I sometimes succeeded in abolishing for a few moments the cerebral functions, and causing deep sleep. In one case the freezing went so deep as to influence the region of the corpora striata, occasioning the violent forward movements which Magendie originated by ablating these parts.

Besides these phenomena, backward motions were sometimes observed, but they were never so violent as when the cerebellum or spine was directly attacked.

Since it is practically very difficult to limit the freezing so as to be sure when you freeze the cerebrum that you do not also chill the cerebellum, I am inclined to suppose that the backward motions which occur when we are acting on the former organ may really be due to an affection of the latter; at all events, it is well to remember that in the experiments here related, and in other like attempts to freeze the cerebrum, I have but once seen the backward somersaults, which are the most remarkable exhibitions of this form of compulsory activity. There is, therefore, some reason to suppose that the cerebrum is not the centre from which proceed these singular impulses.

It was next desirable to know what parts of the spinal column, upon being frozen or chilled, may give occasion to the phenomena in question.

I began by throwing rhigolene upon the skin over the medulla oblongata. The principal symptoms were great weakness, with confused movements of the wings and legs, feeble and laborious breathing, and, after a few minutes, backward walking, with rare attacks of stupor. As the part lay deep, it was difficult to avoid chilling the cerebellum. The following experiment may serve as a type of the larger number, which it is needless to report:—

Expt. 11.—Rhigolene on skin over medulla oblongata for two minutes, the skin being drawn tightly over the spine, and the head bent forward. Released, very weak, tendency to fall to left side, shivering, feathers ruffled; on walking forward tends to fall on his bill. Third minute. Begins to show backward motions. Fourth minute. Repeated backward movements. Seventh minute. Increased feebleness, backward spells, gradual recovery, with rare fits of stupor.

In the next experiment I laid bare the bony spine just below the medulla oblongata, and threw on it a jet of rhigolene, during three minutes. Released, lies on side, breathing feebly, unable to move, pupils sensitive, reflex motions in both legs on pinching one of them. Second minute. Put on his feet, rocks to and fro, breathing more laboured; gradual improvement, with fits of deep stupor. Twelfth minute. Backward movements alternately with stupors; slow recovery.

Expt. 12.—Rhigolene on neck, half an inch below medulla oblongata at third or fourth cervical vertebra three minutes. Backward spells at third minute, with incessant somersaults; previously ran about as if well; stupor; tried to enter his cage; plumed himself. Fifth minute. Somersaults ceased, and are replaced by backward walking, varied with stupors. Recovered.

Expt. 13.—The skin in this pigeon was drawn tightly over the spine, and a double jet of rhigolene thrown on the tenth vertebra for two and a half minutes. Released, he ran about, apparently well. Twenty-fifth second. Marked backward spells, which were incessant until the fourth minute, when he had stupor, followed by confused general convulsions and backward walking. Fifth minute. Backward somersaults, etc. Recovery.

The spine was next acted on at the third cervical vertebra, with the same phenomena. In a second experiment at this same point a double jet was used. The feebleness and disorder of respiration were more marked, the stupors and movements were as before. Recovery perfect in both cases.

The next experiments were made at points between the middle neck and the first fixed vertebra, which itself lies a little back of the upper line of the scapula. In every case I obtained the usual series of backward movements, stupors, and intervals of perfect control. I find that no somersaults are noted in connection with these records, but as they occurred when the spine was chilled below this point, the exception becomes unimportant.

The upper interscapular line is marked by a prominent vertebra, just below which lies the first fixed portion of the spine. In a well-grown pigeon it is at least three and a half inches below the lower level of the skull. Beneath this point the backward spells can no longer be obtained by any extent or depth of freezing.

The following notes relate one out of many experiments in which the jets of rhigolene were thrown exactly between the shoulders:—

Expt. 14.—Rhigolene jet four minutes on first fixed vertebra, at upper level of interscapular space. Released, he ran about, and in fifteen or twenty seconds sank down, shivered, and ran backwards repeatedly; during the quiet intervals he attacked another pigeon. He was next seized with stupor, then another series of backward spells, and again stupor, after which he once more assaulted the other pigeon. Recovered.

In other experiments I guarded the spine with my fingers above and

below the frozen part, but still obtained, in nearly every case, the retrograde motions and the stupors.

Expt. 15.—Froze skin with rhigolene jet one-half inch below prominent inter-scapular vertebra, at level of second dorsal vertebra, for four minutes. Released, he walked away briskly; in half a minute crouched, showed signs of weakness; has spells of stupor, which come on gradually, so that if he is on a perch he falls off, and is aroused by falling; well in the intervals, except that he seems weaker than common. Observed one hour, when he was well, having no longer any backward spells,

Expt. 16.—Rhigolene jet four minutes on spine, half inch below first fixed vertebra. Ran about as usual; appeared agitated and restless, and weak in his legs; no backward spasms, no notable stupor.

Expt. 17.—I next threw rhigolene jet on the spine, one inch above the line of the great trochanters of the femur, a point easily found. It is at the upper level of the sacrum. Froze during four minutes. Released, he ran about clumsily, tripping, intertangling his legs as he moved, and using his wings to aid progression. The movements were so futile and irregular that they presented much the same appearance as when the cerebellum has been frozen deeply or removed by the knife; no stupor, but occasional tendency to rest quiet in a corner; no backward impulsion. Recovery.

Expt. 18.—Rhigolene jet thrown for four minutes on spine, half an inch above line of trochanters. Clumsy motions, great feebleness of limbs, walks crouching, now and then falling on his side. One and a half minutes. Sank to rest in a corner, shivering; tremor of legs, especially the left leg; no backward motions or stupors. Recovered.

Expt. 19.—Rhigolene jet on spine four minutes, at the last dorsal and first lumbar vertebra, over the place at which the nerves of the legs make exit. Sudden and violent tetanic spasms of both legs and the tail, during which he fluttered about with the aid of his wings. At the third minute the spasm relaxed, and in four and a half minutes he could walk; he remained feeble for a time, but in an hour was as well as usual.

It results from these experiments and others that at or about the fourteenth vertebra counting from above downwards, we cease to notice the backward spasms and stupors, and see only signs of weakness or of tetanic rigidity in the legs; usually these phenomena come on some time after the freezing, and reach a maximum within ten minutes.

It appears thus far that in pigeons the application of cold to the cervical spine occasions, after a brief period, peculiar backward movements, resembling those which have been previously produced by mechanical injury of the cerebellum. These abnormal actions are, in extreme cases, backward somersaults, followed by spells of backward walking, and accompanied with spasmodic movements of the head, to be fully described hereafter. In milder cases only the backward walking occurs. Both of these forms of constrained movement are met with when the cerebellum has been chilled. A further series of experiments determined that it is immaterial whether the spine be acted on behind, at the side, or in front. In fact, this organ in the pigeon is so small in diameter, and the freezing so difficult to limit, that we might naturally look for the spasms to follow an application of cold to any side of the spine.

It is indifferent whether we freeze through the skin drawn tightly over

the bone, or act on the bare nerve-tissue itself. The following is an example of the latter mode of affecting the nerve-centres :—

Expt. 20.—Exposed spinal cord of pigeon at fifth cervical vertebra, without hemorrhage of any moment, covered it with a small piece of glazed paper, and threw on this pulverized rhigolene jet for twenty seconds. Released, the bird lay twenty-five seconds breathing heavily, as if about to die, and was then suddenly seized with violent backward somersaults, which were continuous during one minute. They were followed by and finally alternated with fits of stupor, the whole ending in backward walkings. Recovery.

I was now interested to know whether the same results could be obtained by chilling the spine of other birds. For this purpose I selected the chicken, making the following very remarkable observations.

Expt. 21.—Exposed bony spine of a large chicken-cock, and for five minutes threw jet of rhigolene upon it, at a point about three inches below occiput. Released, he walked away without any signs of stupor or sickness. In a minute he stood still, looking about him as if confused. At the second minute he began to move backwards, rotating to the left, with long, slow, and strangely deliberate steps. The rotation seemed to be due to a feebleness of the left leg. He moved in a circle of about two feet in diameter, and now and then leaped up in the air abruptly. His head was not thrown down as was always the case in pigeons, and the action had none of the appearance of spasm which it presented in that bird. After five minutes continuance of this most extraordinary motion, his steps became more awkward and irregular, as well as more rapid and spasmodic, but he now ceased to move in a circle.

At the seventh minute came the first pause, and his attacks were henceforward separated by intervals, during which he walked as usual. As the spasm came on, he slowly stooped, drooping his tail feathers, and raising his head. He seemed to have difficulty in extending his toes, which doubled under him as he stepped, and increased the awkwardness of his gait. After twenty minutes his spasms ceased.

Repetitions of this experiment gave like results, and in one case the backward movements were produced by the application of the rhigolene jet during only thirty seconds.

I have totally failed to produce these curious fits in the rabbit, the only mammal upon which I have as yet experimented.

The following analysis of observations on rabbits exhibits my results in this direction :—

Expt. 22.—Froze the bared occiput of young rabbit two and a quarter minutes. The only symptoms were feebleness, and signs of pain, such as squealing, etc.

Expt. 23.—Froze same point four and a half minutes. Fell on side; kicked a good deal; apparent temporary want of power to co-ordinate his muscles; walked freely after a few minutes.

Expt. 24.—Froze rabbit on spine five and a half minutes, an inch below occiput. Released, he lay kicking violently half a minute, then rose to his feet, and fell, kicking again. Finally, he rose and fell several times without kicking, and, at length, was able to walk freely. Recovered in half an hour.

In all the other cases, four in number, I observed disordered movements, and, at the close, great weakness only.

The failure to produce in rabbits the results so readily obtained in birds appeared to indicate some previously unsuspected differences in the nervous

systems of these two classes of animals, and made me desirous to see whether I should succeed any better with cold-blooded batrachians. I therefore made a number of experiments upon frogs, but without the satisfactory results I had hoped for. When the rhigolene jet is thrown upon the region of the brain, the functions of this organ are abolished for a time, and the frog exhibits the phenomena which are common to this animal when decapitated. A jet cast on the spine occasions spasmodic movements of the legs, and, at intervals, violent tetanic contractions. After a few minutes the frog is able to crawl, but does not recover the power to leap, its usual mode of locomotion, until a longer time has elapsed. Recovery is always perfect, and there are no backward movements.

When the jet is thrown on the back of the prominent eyeball, the posterior tissues of the eye are frozen without the cornea having become dim, and in this case very perfect temporary cataract is produced.

The real seat of the backward impulses in birds would seem to be at any point from the lowest cervical vertebra up to the cerebrum, whose power to originate them is at the least doubtful. Two facts, or sets of facts, led me to think it possible that it was in every case the cerebellum or the medulla oblongata, which was the organ finally responsible for the production of the spasms of retrograde motion, which we have been considering.

The first of these facts is the well-known and valuable discovery of Brown-Séquard, that in Guinea-pigs mechanical injury of certain regions of the spinal cord, from the seventh dorsal to the third lumbar vertebra, subjected the animal to fits of an epileptiform nature, which might be induced by various means, or might arise spontaneously. Moreover, these spasms began about the face, so that the spinal wound (partial section) must have produced an over-excitability condition of the nerve-centres above the point of injury.

In my pigeons, likewise, the spasms began with a flexing of the neck, etc., so that it is altogether possible that in these animals also the spinal irritation may act by causing an undue excitability of organs within the skull.

Before continuing, it may be as well to state that I do not recognize any other relation than I have here pointed out between Dr. Brown-Séquard's very brilliant discovery and that which I am now setting forth. The fits he caused came on after some weeks had elapsed; they were seen in Guinea pigs; they were due to mechanical injury to the dorsal or lumbar spine only, and were finally epileptiform, in all of which respects they differed from the novel facts I have observed.

The second set of facts, above alluded to, has also made me hesitate in assigning to the point of the spine injured by cold, the entire responsibility of producing the retrograde spasms.

Magendie pointed out what many other physiologists have since seen, that certain deep injuries of the cerebellum, especially in birds, gave rise to

backward somersaults and movements, which were very violent, and were sometimes continuous for days, or were interrupted only for a few moments when exhaustion was complete.

The spasms caused by cold applied to the spine were also of this retrograde nature, and I was therefore furnished with an additional motive for suspecting that they might really be due to a reflex affection of the cerebellum.

To determine the relation between backward spasms originating in mechanical injury of the cerebellum, and those due to chilling of the spine, I made a large number of experiments and observations. And first, it is to be observed, that when we chill the cerebellum, we cause convulsive movements which cannot be distinguished from those which occur when we chill the cervical spine. Either the whole of these fits then are referable to one single organ, the cerebellum, or else there is in the pigeon an extensive region, at least four inches long, and stretching from the cerebral mass to the first dorsal vertebra, any portion or section of which is capable of developing the retrograde convulsive motions when treated as I have described.

Backward somersaults and enforced backward walking from mechanical injury to the cerebellum, differ very remarkably from those produced by cold. The wound of the cerebellum must be deep to give the proper effect. The result is violent tumbling backwards, or sideways and back, with little or no respite, and certainly with no intervals of healthy activity. The spasms from cold, though often as violent, do not endure so long. They end in backward walking, and this in perfect health. I have caused them by the application of cold to the spine twenty times in one pigeon, within a few days, and still he not only survived, but ate, drank, and moved with usual vigour. Besides this, the spasms from cold alternate with attacks of stupor, in which the head falls, the eyes are shut or open, and the pigeon seems to be in a kind of lethargy. When in this state it may often be handled, or laid on its back or side, without an effort at resistance, while at any moment a loud sound or a sudden motion will break the spell, and it will abruptly run backwards several feet. It was very remarkable to observe the mode in which the stupor came on. If the pigeon was on a perch or window-ledge, its head gradually fell, the body swayed backwards, and at last the feet unclapsed, and the bird fell on the floor.

In the chicken the stupor was sometimes so deep that it could be held passively suspended by one foot or a wing.

The intervals of healthy activity between the times of stupor present no marked phenomena to distinguish them from the common state of the pigeon.

There are some other differences between the spasms from chilling the spine or cerebellum, and those from wounding the latter organ. In cerebellar injury the head is carried well back and high up. During the somer-

saults it is drawn further and further back, until the bird rolls head over tail.

In the spasms from chilled spine or cerebellum, the head is carried at ease during the intervals between the fits; but at the moment of attack the bill strikes the floor quickly, first on one and then on the other side, the head being drawn violently forwards. Even in the most terrible of the somersaults caused by cold, the head was drawn forwards, and the backward turn was produced by the action of the muscles of the legs and wings, rather than by those of the back, neck, and spine.

It remained to determine if, when the cerebellum was severely injured, or ablated, I could still obtain the typical backward spasms on freezing the spine.

I found that when the cerebellum was partially injured, so as to occasion turning, or backward somersaults, that an after application of cold to the spine, would introduce into the convulsions rare attacks of the peculiar form of retro-spasm, which were characteristic; that is to say, the pigeon would retreat, with first a spasmodic flexion of the head and neck.

When I ablated the cerebellum, so as to produce utter want of co-ordination, I always failed to secure the display of any backward motion, upon afterwards chilling the spine. To settle this question more thoroughly, it will be necessary to ablate the cerebellum, and keep the pigeon until it recovers the power to control its movements, as does sometimes happen.

If then it should continue to have retro-spasms upon freezing the cervical spine, we might reasonably conclude that these spasms do not exact the interference of the cerebellum—a question which, after all, I should not have thought it necessary to raise, if the peculiar retrogressive nature of the fits had not pointed to this organ, for, up to this time, as I have stated, no other has been known to possess the power to originate this special form of convulsive action.¹

At present, therefore, I cannot attribute the spasms from cold to the spine alone; and, indeed, I feel strongly inclined to regard this organ as merely the point of departure of a morbid excitation which is finally translated, so to speak, by the cerebellum, into a language of its own, and thus occasions a peculiar form of compulsory movement.

While considering, in this connection, the whole train of symptoms which follows the use of cold on the spine, there is still left for consideration the state of stupor to which the animal becomes liable when so treated.

This symptom is often slight in character, but is sometimes so well

¹ Elsewhere I have mentioned the medulla oblongata as having been supposed capable, when injured, of causing retro-pulsion. There is, however, some doubt on this point; but, at all events, my reasoning would apply to any organ in the head which might be presumed to have this property.

marked that it resembles the deepest sleep, and even approaches the condition of coma. It then becomes plain that this is a state of system in which the cerebrum is affected, and for a time loses its functional activity. Of this there can be no possible doubt. As it was suggested, however, that the stupor might be due to the general depression of temperature caused by the freezing, I made numerous experiments to settle the question thus raised. For this purpose, I chilled or froze muscular and other parts for five minutes at a time, but without obtaining stupor or spasms. Moreover, I found that both symptoms often continued unaltered, when the pigeon had regained its normal standard of temperature.

If, therefore, chilling the spine determines a marked *cerebral* disturbance, there is no reason why we might not assume, with logical propriety, that the *cerebellum* may be ultimately responsible for the backward spasms. Without being at all sure of this, I beg leave to offer the above considerations as casting some light on a point which I still regard as most obscure.

In dealing with this subject, I have neglected to consider the possible share which the medulla oblongata may have in causing backward movements. Magendie considered that both this organ and the cerebellum were the seats of a normal forward impulsion. The corpora striata were, as he conceived, the centres of an opposite tendency, so that, when the two former organs were wounded, the balance was destroyed, and retrogression took place.

Apart from his theory—from which most recent biologists, excepting Vulpian, have totally dissented—it is enough to know that the medulla oblongata may give occasion to these motions, so that it is not impossible that the backward spasms which follow chilling of the spine may be finally referable either to this centre, or to the cerebellum, or to both.

I have never caused such movements by injuring the medulla oblongata, and the passage in which Magendie states the fact is a very brief one.¹ If, however, he be correct, and if chilling the spine can cause backward spasms by an indirect influence on higher nerve-centres, whatever I may have said in regard to the cerebellum is equally applicable to the medulla oblongata, or to any part whose direct lesion is known to produce retrograde spasms.

We have still to study the nature of the injury done to the spine or brain by cold applied through the skin or directly.

It was seen throughout my experiments, which have reached to ninety in number, that in almost every case an appreciable interval—and often a long one—existed between the close of the freezing and the access of the spasms. This period varied from a few seconds to twelve minutes. If there was any primary effect, it was merely feebleness, or disorder of movement. When I noticed these facts, I suspected at once that what is seen

¹ Précis de Phys. Magendie, ed. 1836, p. 409.

on the skin after freezing, repeats itself in the nerve substance. First, there is chilling and contraction of bloodvessels, and then actual freezing, which is rarely very deep. Indeed, I have found it most difficult to freeze the pigeon's entire breadth of spine. When this does occur in the upper cervical region, death by apnœa follows at once.

The freezing being over, the part thaws, and long-continued, intense congestion ensues, as any one may observe who will try the effect of the ether or rhigolene douche on his own skin.

It only remained to see if this congestion actually took place in the nerve-substance, as I suspected it must do.

To determine this point, I laid bare the cerebrum of a large pigeon, and carefully noted the colour of the tissue, and the number and position of the chief vessels of the meninges. The jet of rhigolene was then used directly on the part. The visible vessels were instantly frozen, with their contents. As the part thawed, it became intensely congested, the brain darkening distinctly, and the vessels of its transparent coverings increasing in size and number, so that those which could before be seen were larger, and new ones, previously unseen, came into view.

This experiment was repeated several times, with no essentially different result.

In the last mentioned experiment I had preserved the cerebral meninges intact. On a second pigeon I repeated the observation, removing the membranes with great care. I found that several large vessels penetrating the brain from below, came to the surface, and were for the most part torn asunder in displacing the membranes. I chilled the bare cerebrum, covered with thin caoutchouc for half a minute. As it thawed, an intense congestion appeared, with numerous points of much deeper colour. This condition increased during several minutes, but caused no notable disturbance of function.

In the spine of the pigeon I have thought I could see a deepened colour after freezing, but of this I am not sure, owing to the small size of the cord. When, as I shall presently show, we act on this part by other irritants than cold, the resultant congestion is no longer doubtful.

The singular convulsions and stupors which I have described are therefore due, as I think, to the palsy of the vessels which have been chilled by the cold, and which may or may not have undergone previous extreme contraction. The congestion from cold, whether in the nerve tissue or the skin, is most intense at a certain time after the part has thawed, and it is then in the centres that the excitation becomes such as to determine a convulsive attack. These facts naturally incline me to regard the congestion as the essential parent of the nerve changes, which finally result in the spasm and stupor. We should not lose sight, however, of the possibility of the nerve-substance being itself directly altered by the intense cold to which it is subjected. While, therefore, I consider the congestion

which does certainly occur as competent in the case, it is well to remember that the nerve-cells may be most seriously affected during the physical changes of condition, which great alternations of temperature occasion.

My success in causing spasms and other phenomena by the aid of cold, at once led me to anticipate the most interesting results from this method of research, for, if it were now in our power to create in a nerve-centre such a congestion as should allow us to study its effects, and if passing away it should leave the animal in a state of health such as beforehand no one could have looked for, I could not but hope that most important results in the study of pathology might thus come within our reach.

Since, however, it was very difficult to limit perfectly the influence of cold, I endeavored to see if, by other means, I could reproduce the phenomena which cold had enabled me to discover. The production of the backward spells was a very good test. If they were due to congestion, irritants, such as heat and acids, alcohol, etc., should also occasion them by causing an increased flow of blood to the spine. Besides, the local congestion thus created would be manageable, and enable me further to control the phenomena for purposes of study.

After numerous experiments I succeeded in attaining the desired end, and in causing by irritants spinal congestion and backward spasms; that is to say, the same train of symptoms which succeeded the use of cold.

Expt. 25.—The spinal cord was exposed in a pigeon's neck, and water, at a temperature of 165° F. was thrown on it gently from a syringe; about three ounces were used. Released, it walked away and showed no notable immediate result. After half an hour, I repeated the observation twice, using again water, temperature 165° F., and lastly, temperature 190° F. The use of the fluid in fine stream may have lowered the temperature a little, but it certainly coagulated the flowing blood and the bared muscular tissue. Yet to my great surprise the only immediate symptom was a little weakness. The pigeon was observed for an hour, and again three hours later, but exhibited no enforced motions. It was found dead the next morning.

Expt. 26.—I dropped strong ammonia on the bare cervical cord of a pigeon. It seemed to cause pain. The bird moved about restlessly, and at last fell with enfeebled respiration, which became rapidly worse, destroying life in a few minutes after the application to the spine.

In this case, the irritant was too strong, and acted as a caustic. The effect of the heat (*Expt. 25*) I cannot explain, and will only observe that the observation was incomplete, as the pigeon was not watched constantly after the operation.

In the next observation I made use of tincture of capsicum as the irritant.

Expt. 27.—The cervical spine was bared at the fourth cervical vertebra, and treated with six or eight drops of tincture of capsicum. I observed no results during two hours observation of the bird, except feebleness and uncertainty of gait. I had cut the posterior spinal vein in my dissection, and I was not sure how much of the symptoms might be due to loss of blood. The following afternoon, twenty-five hours later I re-examined the pigeon. To my great satisfaction, it had marked attacks of backward motion, but no somersaults. It died forty-eight hours after the operation.

Expt. 28.—Exposed cervical cord, at the fifth vertebra; dropped on it six drops of tincture of capsicum. As the capsicum was applied the long posterior vein of the cord, which I had exposed, but not cut, was seen to dilate suddenly

as though forcibly filled or paralyzed, and the cord visibly darkened, while a sudden hemorrhage disclosed itself on the edges of the incision. When set free, the pigeon was very unsteady, and rolled about on its feet as it walked; I then washed away the tincture with a little water and the aid of a pipette.

At the third minute, distinct backward movements were seen, with the usual dipping of the beak. At this time the spinal substance was intensely congested, but no distinct vessels could be seen. The backward movements occurred at intervals up to the seventh minute, when stupor took place. After this time the spasms took place mostly when the bird was roused from the stupor. This latter condition was not so profound as after the chilling, but lasted longer. After an hour and seventeen minutes he still had very violent backward motions which continued for ten seconds or more at a time, when the stupor returning, interrupted them.

Twenty-four hours later, this bird was well to appearance, ate and drank as usual. The backward movements still continued, but ceased within thirty-six hours. At the end of a week the pigeon was well and active. It died five weeks later; but through an accident; no post-mortem examination could be made.

It thus appears that the backward movements may be excited by agents, which, like tr. capsici, irritate, congest, and perhaps, by virtue of the alcohol, chemically alter the spinal tissue. It is notable also that, as in spasms from cold, so in those caused by an irritant, the attacks appear only after an interval has elapsed, and are therefore not due to primary alterative influences, chemical or other.

I believe that I have made clear, in the foregoing paper, the following points: That cold may be made valuable as a means of studying the functions of nerves and nerve-centres; first, by chilling the organ down to the temperature, as yet undetermined, at which its functions cease. Secondly, by the congestion which follows, and which enables us to imitate at will a pathological condition, and thus to forward the synthetic study of neural disease.

With the aid of cold, and of the irritants which its use suggested, I have occasioned in birds (pigeons and chickens), a peculiar form of spasmodic or enforced movements, consisting in somersaults and sudden backward walking, such as have not been previously observed by physiologists, except when the cerebellum was mechanically injured.

I may be permitted to state, in concluding, that I regard as incomplete the research which I have described. Even the primary questions in connection with it are not all answered to my satisfaction, while so large a number of secondary points of interest have presented themselves as to make it quite unlikely that I should find time just now, among more pressing occupations, to give them the attention they will receive, I trust, from others than myself. Some, at least, of these investigations I hope myself to undertake at a future period.

In the present series of experiments I have been aided throughout by my friend Dr. Wm. W. Keen, to whom I am much obliged for many valuable suggestions.

ART. V.—*On the Detection and Measurement of Astigmatism.* By JOHN GREEN, M. D., of St. Louis, Mo. (With five wood-cuts.)

ASTIGMATISM (from α privative, and $\sigma\tau\acute{\iota}\gamma\mu\alpha$, a point), a name proposed by Dr. Whewell to designate the visual defect dependent on a difference in the refractive power of the eye in different meridians, has been long recognized as an occasional cause of imperfect vision. The conclusive demonstrations of Dr. Young (*Philosophical Transactions*, 1801) and of Mr. Airy (*Transactions of the Cambridge Philosophical Society*, 1827 and 1849) completed the history of astigmatism as a mathematical problem, and discovered the optical means necessary for its correction; but it is to Donders, pursuing the line of ophthalmometrical research opened by Kramer and Helmholtz, that we are indebted for the demonstration of its anatomical characters and the importance of its pathological relations. Far from being a rare or exceptional phenomenon, Donders has shown that astigmatism exists in an appreciable degree in almost every eye, and in its lower grades must be accepted as a normal condition, while in its higher or pathological degrees ($\frac{1}{4}$ or upwards) he has detected one of the most frequent and important of the refractive anomalies to which the eye is subject. Astigmatism may occur either alone or in connection with any of the refractive or accommodative anomalies; it may exist in one eye only, or in both eyes; and it may be symmetrical or unsymmetrical, equal or unequal, in the two eyes.

The different relations which astigmatism may bear to the refractive condition of the eye have been expressed by Donders in the form of several useful symbols, which are now very generally adopted, for the sake of brevity and precision. Astigmatism is expressed by As. Positive or myopic astigmatism in one meridian only, the other meridian being emmetropic, is Am. Negative or hypermetropic astigmatism in one meridian is Ah. Positive astigmatism in one meridian, combined with negative astigmatism in the other meridian, is written Ahm or Amb, according as the hypermetropic or myopic element predominates. Positive astigmatism in both meridians may be considered as myopia combined with myopic astigmatism, and is written M+Am. So, also, negative astigmatism in both meridians is expressed by H+Ah.

These distinctions are important, and help to explain why astigmatism has so long escaped detection as a common visual defect. Thus Am, which is a partial myopia, is felt as a material disturbing influence in distant vision, but is generally mistaken for simple myopia. Ah and H+Ah, although impairing the distinctness of vision, may be so masked by strong accommodative efforts as to escape detection by any of the ordinary test-objects, and the same is true of Am and M+Am when modified, as is too often the case, by the injudicious use of concave glasses. In Ah

or $H + Ah$ the eye is in a state of continually varying accommodative tension, as well in viewing distant as near objects, and is therefore, I believe, especially liable to asthenopia from weariness of the accommodative organs. In Am or $M + Am$ the same unrest of the accommodative organs may render reading or other fine work excessively fatiguing; while, for distant vision, the conversion of Am into Ah , by concave glasses, secures only a partial improvement in the distinctness of objects, at the cost of incessant accommodative effort. Thus, the adoption of concave glasses in Am , and still more in $M + Am$, is often attended with such a marked degree of asthenopia as to lead to their speedy abandonment; but when this does not occur, or when the asthenopia has been overcome by persistent use of the glasses, it is soon discovered that, after all, the improvement in vision is less than it at first appeared to be, and farther aid is sought in a stronger pair. Meanwhile, the habit of completely relaxing the accommodation in distant vision is neglected, and the apparent myopia from this cause seems to confirm the indication for the adoption of stronger glasses, and thus actual myopia is artificially induced, or, if already existing, is needlessly aggravated.¹

The disturbing influence of the negative forms of astigmatism, Ah and $H + Ah$, is generally first noticed after the accommodative function has lost the extreme range which belongs to it in the earlier years of childhood. These disturbances are first detected in near vision, as in reading, and may take the form either of asthenopia, or of premature presbyopia, which is often mistaken for amblyopia. In such cases the adoption of proper convex glasses will restore to the eye whatever visual acuteness it may have originally possessed; but the full visual improvement of which the eye is capable, and especially the absolute repose which is so necessary to the asthenopic eye, can only be obtained by the use of cylindrical glasses, combined, if necessary, with spherical surfaces suited to any existing degree of ametropia or presbyopia.

The characteristic effects of astigmatism in modifying the distinctness of retinal images, may be very simply demonstrated by means of a convex spherico-cylindrical lens, made by combining a plano or double convex lens with a

¹ That this danger of induced myopia from the injudicious use of concave glasses by astigmatic persons is a real one, I infer from the very large proportion of myopes wearing glasses, who, upon proper examination, prove to be astigmatic in a very marked degree ($\frac{1}{40}$ or upwards). This would almost appear, from my own observation, to be the rule rather than the exception, and I cannot resist the conclusion that many of these myopes were originally only astigmatic, and that their myopia is in a great degree due to the ill-advised adoption of concave glasses. I believe that it is in the highest degree imperative, in treating a case of incipient or progressive myopia, to make a careful examination of both eyes for astigmatism, and, if found, to correct it. I hope at a future time to have something more to say upon this subject.

convex cylindrical lens of equal focus. Such a lens has no proper focus for parallel rays, but it may be said to have two approximate foci corresponding respectively to the meridians of greatest and least curvature. At the nearer of these approximate foci, the image of a point of light received upon a screen, takes the form, not of a point, but of a line corresponding in direction to the axis of the cylinder, upon which the cylindrical surface is ground. At the farther focus a similar linear image is formed, but at a right angle to the first. Between the two foci no distinct image can be obtained, but only a rounded spot of diffused light, which will appear of a more or less elongated shape, according as it approaches either of the foci. If, instead of the point of light, we observe the image of an elongated object, such as a window bar, we shall obtain a well-defined image at one or the other of the foci, according as the bar corresponds in direction with one or the other of the two linear images of the point of light. At intermediate distances and angles no distinct image is formed.

The analysis of the visual phenomena of astigmatism would be as simple as in the case of the spherico-cylindrical lens were it not for the disturbing influence of the accommodation. In Am and $M+Am$ this is, under certain conditions, true. At the far point of distinct vision, corresponding to the meridian of least refraction, the retinal images will actually conform in character with those observed in the case of the lens, and the only effect of accommodative efforts will be to throw the whole image out of focus, and so render vision still more defective. In Ah , on the other hand, the eye when at rest is in a condition to receive a distinct image of lines lying in the direction of the meridian of least refraction, while a certain effort at accommodation will suffice to change the adjustment of the eye so as to adapt it to lines lying in the direction of the other principal meridian. With intermediate degrees of accommodative effort, however, vision will be less distinct than at these two points, and the eye will, therefore, either instinctively adapt itself to one or the other of them, according to the peculiar conformation of the object under inspection, or else will unconsciously oscillate from one to the other, so as to make out in succession as many features as possible. So also in $H+Ah$ there will be one degree of accommodative effort suited to one meridian of most distinct vision, and another degree suited to the other meridian, and the unconscious changes from one to the other, and back again, will most effectually confound any attempts to estimate the degree and direction of the astigmatism. Similar disturbing acts of accommodation take place in near vision, also, in all cases in which the two near points fall near enough together to admit of this change from one to the other. Thus, in reading, the eye instinctively adapts itself to the refractive power of the meridian, which admits of, on the whole, the most distinct and easiest recognition of the letters, but as soon as any doubt arises as to any particular sign or letter, an involuntary effort shifts the adjustment to the other focus, with, perhaps, an equally

unconscious rotary movement of the head or of the book. So long as the range and region of accommodation suffice for these adjustments, so long may the phenomena of astigmatism be overlooked in the mass of confused and seemingly inconsistent experiences, and this explains how it is that so many cases of astigmatism are first detected when the eyes have become presbyopic, either from the approach of old age, or in consequence of original hypermetropia.

The phenomena of astigmatism are also frequently masked by a difference in the refractive power of the two eyes. Thus, with a difference in refractive power equal, or about equal, in degree to the astigmatism, it may happen that, by the use of both eyes, lines corresponding in direction to the two principal meridians will be distinctly seen, while lines intermediate in direction appear confused.¹ So far, binocular vision may be an improvement over the use of one eye, but, unfortunately, the effect of the combination upon the image of a point is to transform it, not into a simple line, as either eye would do by itself, but into a cross. Here, then, the simultaneous use of the two eyes may materially detract from the distinctness of vision.

Similar anomalous results may be observed where the refractive power of the two eyes is equal, but when the direction of the principal meridians varies. In the greatest number of cases of astigmatism, especially in the lower grades, the direction of the principal meridians undoubtedly approximates to the vertical and horizontal, but generally with a very appreciable variation. This variation is oftenest symmetrical, but the exceptions are exceedingly common.

In the investigation of refractive anomalies of the eye, it is of the first importance to eliminate the disturbing influence of accommodative efforts, for in this way only can we in any case be certain to detect even a pretty high grade of astigmatism. This is best attained by the employment of rather large test-diagrams, hung upon the wall at a distance of fifteen or twenty feet, so as to avoid the necessity of sensible convergence of the visual axes. In the negative forms of astigmatism (Ah and $H+Ah$) the eye must be fitted with a convex lens of sufficient power to neutralize, or perhaps a little more than neutralize, the hypermetropia, so as to convert the case, for the purposes of the examination, into one of Am or $M+Am$. If we have to examine a myope for astigmatism, we must test his vision either without glasses, or with such concave glasses as shall leave a little of the myopia uncorrected. The disturbance caused by accommodative efforts may also be overcome by the use of optometers based upon that of Dr. Young (*Philosophical Transactions*, 1801). Such an optometer, with a stelliform diagram, has been employed by A. Burow

¹ In this fact lies an important chance of error in the use of the common test diagrams, constructed of vertical and horizontal sets of lines.

(*Archiv für Ophthalmologie*, IX. Band, Berlin, 1863); and more recently, with many improvements, by E. Javal (*Annales d'Oculistique*, tome lv., 1866).

2dly. In view of the great difference which often exists in the refractive phenomena in the two eyes, the examination should always be conducted with one eye at a time. This is greatly facilitated by the use of a little screen hung by a pivot to the centre of a pair of trial spectacle-frames; when the screen is placed parallel to the visual axes, the test object is visible to both eyes; to exclude the vision of either, it is only necessary to turn the screen through a small angle to the right or left.

3dly. The method employed must be competent to the detection of astigmatism, in whatever direction the principal meridians may happen to lie.

4thly. It must afford the means of accurately measuring the direction of the principal meridians.

5thly. It must provide for the accurate measurement of the refractive power in the two principal meridians, or the difference in refractive power in these meridians.

Lastly. Having corrected, by experimental glasses, any ametropia or astigmatism which may have been discovered, the state of the accommodative function should be investigated. The eyes should then be tried together, or, if the difference in the two eyes is too great for useful binocular vision, it may be of advantage to correct them singly, one for near and the other for distant vision, thus keeping both eyes in habitual use, and conferring the incidental benefit of distinct vision both of near and of distant objects without changing or removing the glasses.

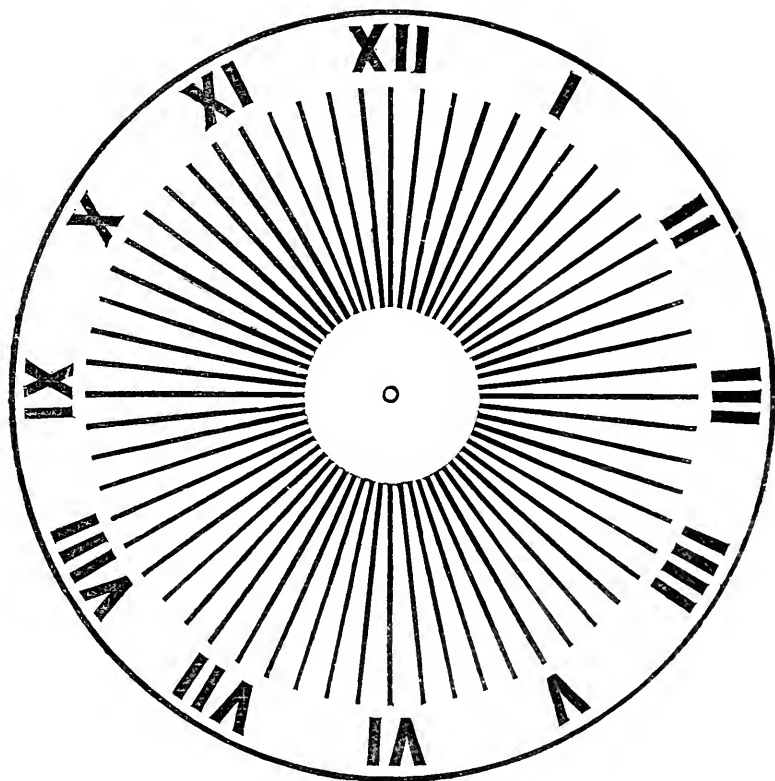
The astigmatic tests hitherto most employed are the illuminated point or line, and the card of vertical and horizontal lines. The former test is made by punching a hole or slit in a sheet of thin metal, which is hung in a window or before a lamp. The vertical and horizontal lines, in sets of three or more, are ruled or printed in black ink on white paper. In using the illuminated point, the test of astigmatism is in the apparent elongation of the point in the direction of one of the principal meridians. With the vertical and horizontal lines it is a question of the relative distinctness of the two sets.

These tests, as ordinarily employed, are not very satisfactory in practice. The changes in the apparent form of the bright dot are not very conspicuous, and it is not always easy for the person examined to give an accurate and intelligible statement of what he really sees. The vertical and horizontal lines would answer well enough, if they always coincided in direction with the meridians of greatest and least refraction; but this is rather the exception than the rule. Both tests are subject to certain fallacies, and they give but a rough indication of the direction of the principal meridians. They are both, however, susceptible of improvement, the line tests by simply increasing their number and giving to them various degrees

of inclination, the dot tests by multiplying the dots and arranging them in rows of different degrees of inclination.

The tests which I employ are made up of radiating lines, or of radiating rows of dots. The line tests, sixty in number, are printed in black or colored ink on a white card, and are arranged as radii of a circle. These lines are severally distinguished by a graduation around the circumference

Fig. 1.



of the circle, like the hours and minutes on the dial of a clock (Fig. 1). Each line is equal in thickness to the lines employed by Snellen in the construction of No. XX. of his test-types, and is designed to be distinctly seen by an average eye at a distance of twenty feet. A second diagram is constructed of twelve sets of triple radiating lines printed upon a circular card, and corresponding to the twelve hours of the clock (Fig. 2). Upon a third card, also circular, a single set of three parallel lines is printed. The second and third cards are arranged to turn upon a pivot fixed in the centre of the first.¹ These cards are about nine and a half inches in diameter.

¹ This use of the clock dial, for which I am indebted to Javal, who has employed it in his very ingenious optometer, has the important advantage over all other

Fig. 2.

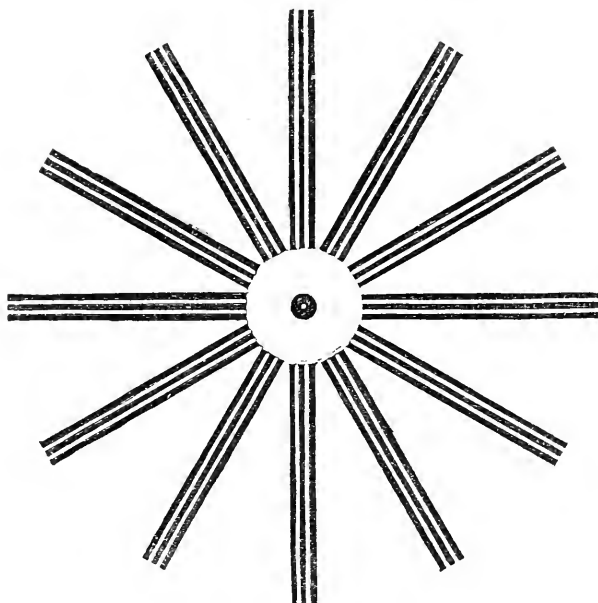
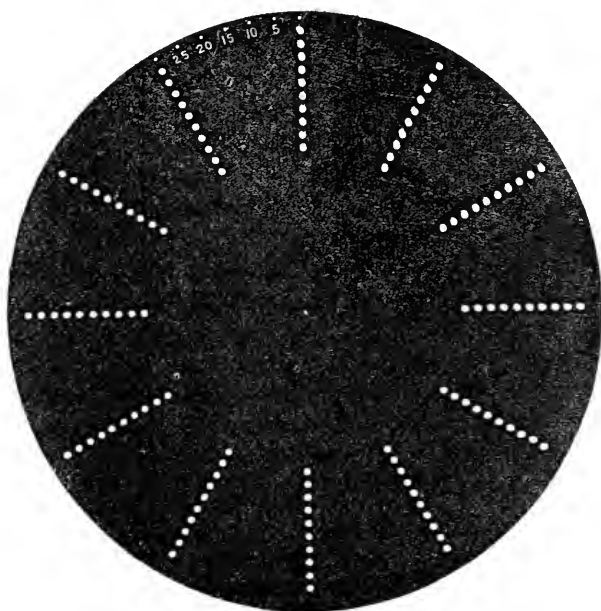


Fig. 3.



graduations of the circle, that it is one with which everybody is familiar. The first diagrams which I drew were made with thirty-two divisions, named after the thirty-two points of the mariner's compass.

The test-dots are arranged in from twelve to sixty radiating rows upon a circular card, similar to those used for the line tests, but are printed to show white upon a black ground (Fig. 3). They may also be punched through the card which may be hung in a window, with a background of thin paper. Upon a second card is printed a single row of dots similar to the first. These cards are arranged also to turn upon the pivot in the centre of the dial. If used as transparent objects, any desired inclination may be given by suspending them from one or another of the pin-holes figured near the circumference of the circle. The size of the dots or holes is, within certain limits, a matter of but little consequence. In cards with twelve radiating rows, I have made them about $\frac{1}{4}$ or $\frac{1}{8}$ of an inch in diameter; with sixty rows, about $\frac{1}{14}$ of an inch. These sizes correspond pretty nearly to Nos. LXX., XXXV., and XX. of Snellen's test-types. For smaller transparent test-objects, designed to be mounted in a lamp-screen, I have used the common perforated card-board of the shops, with holes about $\frac{1}{32}$ of an inch in diameter. The spaces between the dots I have made equal to the diameter of the dots.

These two kinds of tests may be usefully employed together, being in a certain way supplementary to each other. They enable us to determine independently, and with great accuracy, the direction of both principal meridians, and each may be made to serve in many ways to control and correct the results obtained by the other. They afford, also, a ready means of detecting any irregular astigmatism dependent on corneal or lenticular malformation.

Smaller test-diagrams, of about one-third the size of those described, are useful in the examination of strongly myopic eyes.

In applying these tests to the investigation of a case of possible ametropia, with or without astigmatism, one eye is to be excluded from participation in the visual act, either by the use of the little screen attached to the spectacle-frame, or by partially covering the eye with a card or book. The eye under examination is then directed to the diagram with the twelve radiating triple lines (Fig. 2), hung upon the opposite wall of the room.¹ The question may then be asked, whether any one of the twelve sets of lines is distinctly seen. The eye is then to be corrected, if necessary, by the weakest concave or strongest convex glass compatible with perfect vision of any one set of lines. Should all the sets of lines appear equally distinct during the trials with different glasses, and especially if the same result is obtained with the test-dots, we may confidently decide that the case is not one of astigmatism, and may proceed at once to the determination of the acuteness of vision and accommodative range by the well-known

¹ If the eye is strongly myopic, it may be more convenient to use a smaller test-object, which may be attached by a slide to a yard-stick, so as to form a sort of optometer.

method of Snellen. If, on the other hand, either with or without a correcting glass, the lines in one meridian are more distinct than in others, we may be sure that we have to do with a case of astigmatism. The direction of this meridian of most distinct vision is now to be carefully determined by the diagram with the sixty radiating lines (Fig. 1). To ascertain with greater accuracy the refractive power of the eye for this meridian, the card with the three parallel lines may now be placed upon the pivot, and turned in the direction of most distinct vision, as determined by the last observation. A few trials with stronger or weaker glasses will soon determine the proper correction for this meridian, which, if the examination has been properly conducted so far, will be the measure of any refractive anomaly in the ocular meridian of the least refraction. It only remains to determine the refractive power of the eye for the other principal meridian, which may be done by the use of common concave glasses in a stenopæic apparatus, or, still better, by the use of concave cylindrical glasses. The card last used is to be turned to a position at a right angle to the first, and concave cylindrical glasses, with their axes in the same direction, held successively before the eye until the lines appear as distinct as they appeared in the other meridian; if the stenopæic apparatus, with common concave glasses, is employed, the slit must be turned at a right angle to the direction of the test-lines. Having thus ascertained the weakest glass through which the three parallel lines are distinctly seen in the last position, we have in the focal distance of this glass the measure of the difference of refraction in the two principal meridians, or the degree of the astigmatism; the absolute refractive power of the eye in this meridian is found by adding this value to that already found for the other if the eye is myopic, or by subtracting it if hypermetropic.

Having thus determined the refractive power of the eye in the two principal meridians, it is well to test the result by means of a trial-glass, made either by the combination of two cylindrical glasses adapted to the different degrees of refraction in the two meridians, or by an equivalent combination of a spherical with a cylindrical lens.

The other eye is then to be tested in precisely the same way as the first, and the result controlled in the same manner.

Having thus fitted the two eyes with experimental glasses, they should be tried together in binocular vision, using all or any of the test-diagrams, the final test being always the equal and uniform distinctness of all the lines or dots in all parts of the diagram.

If any presbyopia or accommodative insufficiency is present, it may now be estimated by placing a pair of convex glasses, fitted in a frame as a temporary eye-glass, in front of the trial-spectacles, and testing with the smaller types of Jaeger or Snellen.

These test-diagrams may be variously modified in form, and with advantage, for it often happens that a person not accustomed to analyze his

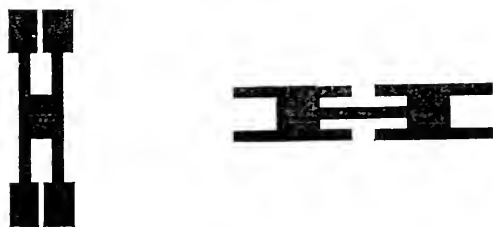
visual perceptions may fail to appreciate a defect which a second observation, made upon another diagram, may reveal. Thus the meridian of most distinct perception of the lines in Figs. 1 and 2 is the opposite of that in which the dots in Fig. 3 appear most distinct one from another. By arranging the same test, too, in different ways, it is possible to ask the same question several times in succession without seeming to do so. For reasons of this nature, as well as to provide a good test for astigmatism more exactly comparable with Snellen's test-types, I have arranged a diagram (Fig. 4) in which short lines or sets of parallel lines of successively increasing degrees of inclination are placed in a linear series, instead of in the form of radii of a circle.

Test-letters may also be employed, with a certain advantage, in the detection of astigmatism. Thus a letter from one of the larger series of Snellen—as No. XXX.—may be repeated several times, always of the same superficial area, but varied in the proportion of height to width (Fig. 5). These letters, which are of common use in or-

Fig. 4.



Fig. 5.



namental printing, under the names of condensed and expanded letters, are seen by an astigmatic person with very different degrees of distinctness, that particular letter always appearing the clearest whose long diameter corresponds most nearly with the direction of the meridian in which the line tests are most distinct.

These short test-lines, and expanded and condensed letters, serve also to illustrate the different degrees in which the legibility of different styles and kinds of letters is affected by astigmatism. Thus the capital Roman letters are not properly comparable with the small letters, and still less with the large or small Italics. Neither ought Roman letters to be compared with writing characters, or with German, Greek, or Oriental texts. Much depends,

too, upon the proper spacing of the letters in the lines, as well as of the lines themselves, for the same astigmatic eye may, with different degrees of accommodative action, be troubled either by an apparent running together of the letters, or by confusion of the lines.

Test-letters for determining the acuteness of vision should be constructed, therefore, not only of sizes proportionate to the distances at which they are designed to be used, but also in such a manner as neither to exaggerate nor conceal the visual defects due to astigmatism. To this end they should be made up, so far as may be, in about equal proportions of vertical and horizontal lines of uniform thickness. Each letter, too, should be, as nearly as is consistent with good proportion, of equal height and width, and the spaces, both between the letters and the lines, should be proportionate to the size of the letters. These conditions were first realized by Snellen, in his "Letterproeven," or "Test-types," published in Utrecht in 1862, and now almost universally adopted as the standard of visual comparison. It is possible, however, that the very simple "Gothic" form of letter **TH** may be preferable to the somewhat more complex "Antique" letter **TH** adopted by Snellen; the experiment has been partially tried in a recent work by Dr. Williams, of Boston (*Recent Advances in Ophthalmic Science*, Boston, 1866).

ST. LOUIS, October, 1866.

ART. VI.—*New Method of Employing Heat as a Resuscitating Agent.*

By JOSEPH G. RICHARDSON, M. D., Union Springs, Cayuga County, New York.

IN the number of this journal for January, 1866, on p. 225, appeared the abstract of a paper by Dr. B. W. Richardson, of London, detailing the commencement of an investigation into the means for rekindling the vital spark when almost extinct, which gave promise of very important results, had not the experimenter's attention been diverted to the opposite desideratum of accomplishing a temporary local death; which he did by the application of ether spray, an invention that has been received, and justly, with so much eclat by the profession both of Europe and of our own Western Hemisphere.

The following case occurred to me shortly after reading the above mentioned digest of Dr. Richardson's paper, and it was during the long hours of anxious night-watching over its subject, the uncertain pulsations of whose feeble heart I was so earnestly striving to invigorate, that those experiments led me to the practice which proved so successful in renewing its

frail life, and which I propose briefly to narrate, hoping that it may assist some brother practitioner under circumstances of similar urgency:—

On the 17th of February, 1866, I was called to attend Mrs. J. McC., a healthy woman of robust constitution, whom I had delivered some two years before of a still-born infant after a very protracted and exhausting labour, the consequence of a marked narrowing of the pelvis at its inferior strait. Finding that parturition was again rapidly approaching, and that the pains were active and frequent, I immediately examined per vaginam and discovered a breech presentation, which, coupled with the probability of another tedious labour, even under the most favourable circumstances, rendered the prognosis as regarded the child's life a very serious one. After the anticipated delay, delivery was accomplished about half past one o'clock on the morning of the 18th; but the infant, when born, was completely relaxed, and made no effort to respire, although a feeble pulsation was perceptible at the præcordia. The usual treatment of the hot bath, cold affusion, &c. &c., being employed without effect, I resorted to artificial respiration, and after a few repetitions of the mouth to mouth process of insufflating the lungs, finding that the heart seemed to beat with a little more force, I was encouraged to continue the treatment. Half an hour elapsed, however, without any further sign of life, and I was about to abandon the case as hopeless, when the child gave a single gasp which was succeeded by others at intervals of nearly a minute; still continuing artificial respiration, I now sought to reinforce it by bathing the chest with whiskey, moistening the lips and tongue with a mixture of spirits of ammonia, applying mustard to the feet and epigastrium, and friction to the extremities; but although by these means voluntary inspiration was obtained at decreasing intervals, until, at the end of two hours, phrenic contraction occurred about every twenty seconds, yet I had the disappointment of finding that whenever artificial expansion of the lung was intermitted, as, through fatigue, I was several times compelled to allow it to be, the intervals between the voluntary efforts became greater and the cardiac pulsations grew more feeble. Seeing, therefore, that the treatment hitherto had in reality accomplished only a temporary and evanescent resuscitation of the powers of life, and spurred on by the obvious necessity of some more potent means, I mentally reviewed the record I had so lately read of Dr. Richardson's remarkable success in restoring the heart's motion by injecting hot blood into the coronary arteries, and after many fruitless efforts to invent a feasible plan for applying that process in the case before me, hit upon the simple expedient of heating the blood in the veins themselves, and then assisting by external pressure to force it back to the heart; with the expectation that with the partial absence of that usual refrigerating agency, inspired air, it would pass over the short pulmonic circuit and be distributed to the cardiac structure without any material diminution of temperature. To carry out this idea I directed a hot fire to be kindled up in the large cooking stove, and having made a bed of old flannels on its ample hearth, I laid the corpse-like body upon it, and with the assistance of some attendants heated the child's legs and arms alternately only a little short of the blistering point, and then by firm centripetal friction drove the hot blood along its desired course. The effect of this treatment was almost miraculous; the heart's pulsation, which, in spite of three hours' labour with artificial respiration and its adjuncts, had continued feeble and uncertain, grew rapidly full and energetic; the respiration, which had commenced again to prolong

its intervals, changed its gasping character, became continuous, and although groaning, otherwise almost normal; and to crown all, the limbs, which had heretofore dangled relaxed from the apparently lifeless trunk, soon exhibited signs of vitality, which, beginning first, after some ten minutes roasting, with a slight tremulous movement of the extensors of the right leg, gradually traversed the entire muscular system until the whole tiny frame shook like an aspen leaf, quivering, one might almost think, with too rude a blast of the breath of life. I remained with the infant for an hour or so longer and experienced the intense satisfaction of observing a continued, though tardy improvement, the skin gradually losing its blue colour and assuming the pink tint of a healthy new-born babe's. Being then compelled to visit some patients at a distance of several miles, I reluctantly left it in charge of the attendant, with the strictest injunctions against attempting to give even the smallest particle of food or drink, fearing, as I did, that the muscular movements were not yet sufficiently established to enable it to swallow. On returning about two o'clock in the afternoon, I can hardly describe my vexation at finding that some ignorant and officious old woman of the neighbourhood had insisted on feeding it with some molasses and water, and that, to the consternation of the mother and nurse, it had, after a few ineffectual struggles, expired in the effort at deglutition.

The arduous duties of a country practice have debarred me from any extended investigations in this matter, but the following experiments performed on the 29th of August, 1866, tend to prove the correctness of my supposition that the circulating fluid could be so far heated through the walls of the bloodvessels as to be rendered active in re-establishing the cardiac movements.

The subject in this case was a young chicken that had been accidentally drowned; carefully opening the thorax in such a way as to avoid any large arteries or veins, I found the heart still beating at 7.55 A. M., twenty minutes after the last gasp, which occurred directly on removal from the water; in ten minutes more it ceased to pulsate naturally, although answering readily to external irritation with the point of a knife, and like the pendulum of a clock almost run down, it would vibrate more and more slowly for some minutes. At 9 A. M., one hour and twenty minutes after respiration ceased, the heart, remaining in situ, was exposed to the heat of a stove under circumstances as far as possible precisely resembling those to which the infant above mentioned was subjected; after submitting it to this heat for one minute, the cardiac movements which a short time before, even under the stimulus of puncture, had been weak and uncertain, recommenced strongly and regularly at the rate of about fifty beats per minute; when the body of the fowl, however, was removed from the fire these contractions gradually diminished until they ceased to be voluntary, and even irritation was feebly responded to. At 9.50 A. M., two hours and a quarter having elapsed after death, the heart was slightly moistened with warm water and again heated as before; without any other agency the auricles and upper portions of the ventricles, which had become relaxed and shrunken, voluntarily contracted and resumed their normal rhythmic movements, though at the rate of only eighteen pulsations per minute, and this continued for some little time after removal from the source of heat. Lastly, that no doubt might remain as regarded the revivifying power of fire (in this subject at least), I waited another twenty minutes until the cardiac pulsations

had again become silent, and then found them to be restored (though at the slower but still regular rate of one in five seconds), by a further application of the life-renewing heat.

Dr. Sansom, in his recent work on the *Action and Administration of Chloroform*, details, in his chapter on Resuscitation, from apparent death by that agent, two experiments of his own which have some bearing upon this subject. In the first—

“The movements of the exposed heart of a kitten were arrested by chloroform vapour, then a jet of steam was directed upon the organ: the effect was instantly to restore rhythmical contraction. (2.) A rabbit was chloroformed until apparent death took place. After a few inflations of the lungs the chest was opened and the heart found beating rhythmically. Warm air of a temperature of 93 Fahr. was blown into the lungs by means of a pair of bellows, an elastic catheter being introduced into the mouth. The heart's pulsations were certainly increased in force and rhythm (?) a contraction of the ventricles taking place just after each inflation.”

Thus it will be seen that the result of Dr. Sansom's first experiment accords precisely, so far as it goes, with that furnished by my own, and as regards his second, may not the current of warm air injected into lungs have produced its beneficial effects by imparting caloric to the blood while contained in the vascular network of the pulmonary vesicles, from whence it would be driven in a few seconds into the coronary arteries and then exert its stimulating power upon the cardiac structure? Were it not for the danger of causing pneumonia, heating the blood thus through the lungs would be a great improvement on the plan above described, but while blistering, or even burning the skin upon portions of the extremities, would prove but a minor evil in comparison with the individual's death, production of such acute *pulmonary* inflammation must imperil the very life we seek to save.

I may further mention, as, in its small way, an analogue to the primary fact upon which Dr. Jenner based his immortal discovery, that a few weeks after attending the infant as above narrated, I was called to see a little son of one of the largest sheep-breeders in this section, and, during my visit, observing a huge basket in the corner of the dining-room, from which issued an almost continuous bleating, was naturally led to inquire about the lambs. I learned that those which seemed feeble were brought into the house, dried, warmed, and fed with whiskey sling, by which means most of them were restored, but I noticed that while a number struggled in a purposeless way around the basket one lay with its eyes closed and to all appearance dying; of this the owner remarked: “That fellow is pretty near gone; nothing but roasting will save him.” In some surprise at the coincidence, I inquired whether that was of much service. “Oh, yes,” replied Mr. C. “When everything else fails I put them close before the stove and give them a good roasting; *that often brings them to life again*,” adding, afterwards, “It's astonishing what an amount of heat they will bear, and do them good too.” Thus forcibly illustrating by his experience the truth so

often noted, that our boasted science, while it teaches us to work intelligently and with a skilful adaptation of varying means to diverse ends, is yet on many occasions a tardy guide in comparison with popular observation.

If, as an English writer has remarked, the spirit of the Royal Humane Society's directions for resuscitation can be summed up in the one word *Warmth*, this proposition may be expressed as simply to advance another step, having the monosyllable *Heat* for its exponent; and I hope that some of the many readers of this journal who have more abundant opportunities for such experiments, will investigate and report the practical value contained in the suggestion of artificially heating the blood (not warming it merely, as has been heretofore advised) within the limbs of persons apparently dead, and then propelling it as rapidly as possible towards the heart, the pulsations of which are probably, in some instances at least, so weak and infrequent as to escape observation for minutes before they finally cease. The method seems to promise somewhat not only in the cases of still-born infants, but also in those of patients asphyxiated by drowning, hanging, or the inhalation of noxious gases, especially the vapour of chloroform, and it possesses the great advantage that its essentials are almost always readily accessible.

ART. VII.—*The Permanganate of Potash in the Treatment of Carbuncle.* By THAD. L. LEAVITT, M. D., of Germantown, Pa.

THE beneficial effects accruing from the local use of the permanganate of potash in the treatment of sloughing ulcers, phlegmonous erysipelas, and hospital gangrene, having been most thoroughly tested and proved during the last year of the war, in army hospital life, it occurred to me that its peculiar remedial qualities would alike prove successful in that most painful and distressing lesion, carbuncle, originating as it also does, from a depressed vitality, and a morbid condition of the blood. The most satisfactory and encouraging results have been obtained in the only cases in which I have had an opportunity to employ it.

Mrs. R—, æt. about 60 years, was visited, during the absence from town of her family physician, and found suffering terribly from a carbuncle located upon the left shoulder-blade, just above the spine of the scapula, and occupying the supra-spinous fossa. Loss of sleep, constant pain, and a naturally nervous temperament combined, induced a mental disturbance almost amounting to delirium. The tumour was in its sixth day, with all the general accompaniments, of the size of a hen's egg, tumid, tense and shining. A free crucial incision had been made two days before, but with no relief; dense areolar tissue, puffy granulations, and sanious oozings crowded the track of the knife, with no appearance of separation or healthy action. The pulse was quick and compressible, 110 beats in the minute;

countenance anxious and expressive of great pain. Bowels regular. A strong solution of the permanganate of potash (5ss to f3j) was immediately applied with a brush, and a dressing saturated with it covered with oiled silk placed upon the shoulder. Anodynes, beef-tea, milk punch, tincture of the chloride of iron and quinia were administered. The same evening the patient was again seen and expressed herself as feeling much relieved; pulse 98, and gaining in volume and elasticity. The next morning the dressing was removed, and already, although but twenty-five hours had elapsed, true pus had begun to form, the intense pain had subsided, and the patient, to use her own language, declared it "a miracle;" the pain had vanished, the fever was gone; she had slept well and felt some appetite for food. A few days longer the potash was continued; the slough separated, and the wound healed in the short space of one week.

Mr. C——, æt. 50 years, shoemaker; was visited July 30th, 1866. Had been sick three days, was found suffering intensely from a carbuncle situated upon the abdomen just below the umbilicus, of the size of a large walnut, and involving the surrounding structures in an erysipelatous inflammation. Bowels constipated; high fever; pulse 120; heavy breath; tongue furred; anxious countenance; great restlessness and general uneasiness characterized his principal symptoms. Hop and laudanum poultices had been applied, but he had been gradually growing worse, and approaching the condition described, the tumour increasing daily, the parts becoming more dense, and at last an ichorous pus exuded from several small openings. Mild purgation, after which supporting and stimulant treatment was instituted. A slight incision was made, and the permanganate applied, as in the previous case, the dressings being removed once in twenty-four hours. This case was seen seven days successively; the 13th of August he returned to his work, the severity of the suffering having been arrested after the first application.

Mrs. A——, æt. about 49 years, having suffered a few days from a supposed furuncle, and the pain becoming intolerable, called in medical aid. There was found upon the inner face of the left thigh, just below the nates, a well-marked, though small carbuncle; a very slight incision was made and the potash dressing used. No constitutional treatment at all was inaugurated; in three days all signs of carbuncle had disappeared, and the line of incision was healing nicely.

The results in this case were mutually gratifying from the fact that about six years ago the patient suffered from a series of carbuncles appearing in succession along the spinal column, from the back of the neck to the region of the lumbar vertebrae, and lasting all through the winter months, her dread and fear of similar suffering were very great. The permanganate of potash has been eminently successful with me in the treatment of chronic ulcers. The following case of many years' duration, and which had resisted all efforts, yielded to the remedial properties of this preparation.

Arthur M——, tavernkeeper, æt. 45 years, had a chronic indurated ulcer of sixteen years' standing, extending over the superior face of the right leg about four inches below the tubercle of the tibia, and spreading backward on both sides to the malleoli, covering a surface of about twenty-eight square inches, deep and burrowing in some localities, and in others merely

superficial; the whole leg and foot were much swollen and anasarcons, the toes merely protruding from a shapeless mass of flesh closely resembling the foot of a young elephant. An ichorous discharge of a horribly offensive character, together with filthy dressings, augmented the destruction of the surrounding parts.

The advice of an eminent surgeon had been secured a few weeks previously, to the effect that but one alternative remained, amputation; and indeed all appearances favoured such a decision. Proper abstinence, tincture of iron and good diet were directed. The local use of a strong solution of the permanganate of potash and judicious bandaging have already done so much for this case that, at the date of writing, the tenth application of the potash, six square inches, will more than cover the small amount of ulceration remaining, so rapid have been the healing process and the formation of firm healthy tissue; and, in a few days more, we can confidently prognosticate a complete cure.

ART. VIII.—*Bromide of Potassium in Epilepsy.*

By HORACE Y. EVANS, M. D.

It is a matter of surprise that the bromides of potassium and ammonium have not come into more general use in the profession.

Dr. Hammond's little book awakened some of us to a realization of the fact that insomnia could be successfully treated without the use of opium; and further, that in many cases of wakefulness it was positively contra-indicated; yet how very few think of using the bromide of potassium in this affection.

Sir Charles Loeck made public, years ago, his successful use of this remedy in hysteria; yet the old and offensive drugs are to this day used nine times where the more agreeable and effectual bromides are used once.

Delirium tremens can be throttled at its very outstart by this medicine, yet how rarely does a case in private practice escape the routine of opium, alcohol, blisters, digitalis, lupulin, and capsicum. In no disease have their beneficent effects been more marked than in epilepsy.

I propose, therefore, relating the three following cases of this disease out of eight within my knowledge, treated with the bromides.

CASE I. Farmer, æt. 30, living in a miasmatic region. Enjoyed perfect health until attacked with ague; was treated with quinia, and the chills checked. Then followed convulsions, which at first resembled, as far as the pulse was concerned, apoplexy, but soon became clearly epileptic. The attacks returned at irregular intervals of from seven to ten days. He had been carefully treated with remedies such as the symptoms from time to time indicated. When he came under my care he was using tonics and alteratives, and ice-bag to the spine. His pulse was 98, full and strong, tongue furred, bowels sluggish, disgust for food, very restless, severe head-

ache, and marked mental confusion. I continued the ice-bag to his spine half hour daily, ordered saline purge every day, and farinaceous diet. He was very soon visited by another convulsion which left him in a dull melancholy condition, severe headache and insomnia, but no paralysis; commenced next day with the bromide of potassium, gr. xv, three times a day; continued the saline mixture, ice-bag, and restricted diet. An improvement in all the symptoms commenced within twelve hours, and at the expiration of four weeks the patient was apparently well; there was no return or tendency to return of the convulsion. All treatment was then omitted, and at the expiration of seven weeks from the commencement of the treatment, considering himself well, he returned to the use of animal food, which was followed within ten hours by the most severe epileptic fit of any that he had had, and two days later by another. He then returned to the city and was again put upon the use of the bromide and the ice-bag. As at first, the improvement was rapid, and at the expiration of a fortnight, without my consent, omitted all treatment. He returned to the country, used promiscuous diet, and has now passed through the fever season of the locality without ague or convulsions. Says he was never in better health than at present.

CASE II. G. M——, a young man 21 years of age, apparently in a good physical condition, has had epileptic convulsions for the past fifteen years, and at the time of commencing his treatment (March, 1866) he was having, on an average, three attacks a day. He was ordered a saline purge twice a week, ice-bag to spine one hour daily; bromide of potassium, gr. xx, three times a day, and total abstinence from animal food. The interruption in the attacks was immediate; he continued without even an "aura," or any other evidence of the presence of the disease for nine consecutive weeks.

The peculiar effects of the bromine, named by Bazire bromism, having now become developed, the drug was omitted for two days, Huxham's tincture of bark, and a more liberal diet substituted. Before the end of the second day, a severe convulsion returned, and was followed by numerous aura epileptica or minor "spells." The bromide was immediately resumed and its use continued for three weeks without a return of the disease. The increased flow of saliva, sore throat, and restlessness, again gave premonitions of the return of bromism. The dose was now reduced to gr. x, ter die. Again the lurking foe took advantage of the truce and made several sorties which were repulsed by the bromide of ammonium, with the iodide of potassium as an ally. Another month now elapsed without an attack, but the combination last used became so offensive to him that it had to be omitted, and the bromide of potassium resumed in gr. xx doses, which is now (November) being used with results beyond the most sanguine anticipations.

CASE III. Mrs. S. B——, æt. 28, the mother of two children. Insanity and epilepsy in her family. After a serious family trouble, was attacked with convulsions at intervals of a fortnight. The disease was diagnosed hysterical epilepsy, chiefly on account of the long duration of the convulsion. The usual treatment for hysteria scarcely palliated the insomnia and almost delirium during the intervals. Having seen an account of Locock's treatment of this disease with the bromide of potassium, I was induced to give it a trial. She commenced with gr. xx doses three times a day, and an additional dose at night if necessary to produce sleep. Within a week every vestige of the disease had vanished. The medicine was continued in

reduced doses for a month, after which it was entirely omitted. Four months have since passed without a symptom of hysteria or epilepsy, notwithstanding the continuance and actual increase of her family troubles.

I have in my possession notes of other and aggravated cases of this disease which have been so far interrupted and modified by this treatment that the patients have been enabled to commence life almost anew. The three just given are the forms with which we most frequently meet, and therefore cover the whole ground; namely, first, those having an apparent or known cause; secondly, congenital; and lastly, hysterical. The first and third, we have every reason to believe, are cured. The second is so far palliated as to give periods of entire exemption ranging from three to four months. The *modus operandi* of this drug has never been satisfactorily explained. The authorities tell us that it has alterative, resolvent, and sedative effects upon the nervous system.

Looking as we do upon the convulsion as a symptom of the disease, and that the disease consists of an irritated and congested condition of the brain, medulla oblongata, or spine, then the ice-bag comes in as an important auxiliary in producing sedation—though in numerous cases the drug has performed the whole work single handed. It seems to me that the field of usefulness for this medicine is very extensive. It dispels a large proportion of the aches and pains met with in women. Neuralgia, refusing subservience to all other treatment, has yielded to this. So also with chorea, headache, and the forming stage of delirium tremens. It palliates the paroxysms of pertussis. Dr. M. A. Withers, of Pottstown, related to me a case under his care, of melancholy, culminating at times in insanity, which has been so far improved by the use of large doses of this medicine as to give strong hopes of eventual recovery.

ART. IX.—*On some of the Causes which render the Air in Surgical Wards Impure, with a Description of a Portable Ward Apparatus for Supplying Flowing Water, and all the Materials used in Dressing Wounds.*
By THOMAS G. MORTON, M. D., one of the Attending Surgeons of the Pennsylvania Hospital, and one of the Surgeons of the Wills' Hospital for Diseases of the Eye, Philadelphia. (With a wood-cut.)

THE object of this communication is to point out some of the causes which render the air in surgical wards impure, the means of obviating them, and to offer an improved and more rational method of cleansing wounds.

The occurrence of erysipelas and pyæmia, and sloughing in wounds, at times, in hospitals, calls for such investigations, and also for the removal of

every source which even remotely might appear to favour the production of these diseases.

In most hospitals the wards are provided with a number of sponges and tin or earthenware basins for the washing of the wounds; generally one basin and sponge for each patient, which, after being used, are deposited under the beds, often in a damp, and not unfrequently in a wet state, and thus allowed daily to undergo a slow drying process. The ward air necessarily becomes in a degree contaminated, since it has been found almost impossible to free the tin basins and sponges thus used from odour; while the earthenware, the glazing being often defective, in a short time becomes ill-smelling from similar causes.

The method so commonly practised of sponging and responding wounds from the same basin of water is evidently objectionable, while in some cases it is positively injurious, for after a portion of the water has been once passed over an ulcerated, gangrenous, or sloughing surface, in the usual way, the entire bulk of water becomes more or less impure from its admixture with the discharges, and thus is rendered totally unfit to be brought again in contact with the wound.

Sponges have long been used for various surgical purposes; their peculiar nature allowing a great quantity of water to be retained in them. But from many hospitals they have been for ordinary ward purposes entirely discarded, for not unfrequently, through carelessness or otherwise, they have proved a vehicle for propagating disease. The expense attendant upon their use in contagious affections is considerable, where fresh sponges are required for each dressing, while, at all times, it is with great difficulty that they can be kept clean and free from odour.

A parcel of oakum, "the material of old tarred ropes, untwisted and pulled into loose hemp," makes an excellent substitute for the sponge, and will be found to answer every indication, especially with flowing water in dressing the wounds, and should be thrown away after having been once used.

The correct principle in washing wounds is in having a stream of water flowing continuously upon the part during the cleansing process, and in not permitting any portion of the water once used to be returned again in contact with the part washed.

The plan which I have lately introduced into the Pennsylvania Hospital is designed to improve the condition of surgical wards, by removing prolific sources from which odours arise, and especially by instituting a more cleanly mode of dressing surgical cases:—

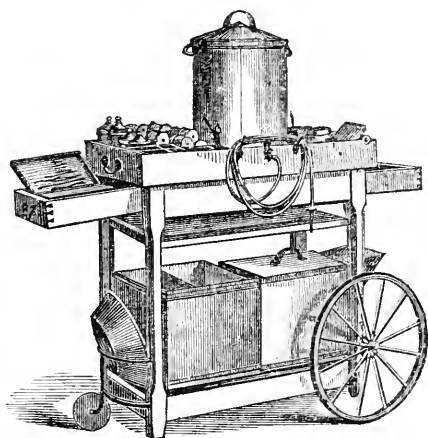
1st. By dispensing with all the basins and sponges from the wards.

2d. By having a supply of fresh flowing water for each wound or part to be dressed, upon which the water once used is never returned.

With this arrangement, and in substituting the oakum for the sponge, the hands of the surgeon need not necessarily come in contact with the

wound or the water, thus lessening the chances of inoculation, for the force of the stream carries off all the discharges from the wound, the oakum aiding in the process by removing the more tenacious matters.

To carry out this method, and also to have in a compact form all the dressings used ordinarily for ward purposes, I had constructed an apparatus which consists (see accompanying figure) of a table or stand, three feet high, three feet long, and seventeen inches broad, supported on three wheels, two of these being twenty inches high, the rims of which are covered with leather, to insure less noise when moving through the wards; the third is smaller and placed at one end, in front, and moves upon a pivot, which allows the apparatus to be wheeled in any direction.



Upon the top of this table, and in the centre, is placed a tin reservoir capable of holding six or eight gallons of water; to a stopcock at the bottom, a small-sized gum-elastic tube, nine or ten feet in length, is attached, to the extremity of which there is a metallic tube four inches long, which is also provided with a stopcock to regulate more readily the flow through the tube.

On either side of the water-can appropriate places are partitioned off for the bandages, charpie, oiled silk, adhesive plaster, and jars for holding the lint soaked in the various solutions commonly used for ward applications; drawers are placed in each end and serve as receptacles for towels, instruments, etc. etc. One large tin bucket, with a projecting lip, occupies one-half the space under the table, into which all the refuse dressings, poultices, soiled water, and oakum, from each patient, are emptied. Another can, with two compartments, adjoins the bucket; into one of these the soiled bandages are thrown, while the other carries the fresh oakum, cotton batting, muslin, and old linen, used for the ordinary ward purposes.

One good-sized tin basin serves for the entire ward or series of communicating wards, since it serves merely as the receptacle for the water and discharges flowing from the part during the process of dressing. A can for hot water, for heating the adhesive plaster, completes the apparatus, which is pushed to the foot of each bed; the length of the gum-elastic tube and the elevation of the supply of water allow the stream to be carried to any part of the patient which requires cleansing, in either the recumbent or sit-

ting posture. The apparatus may be considered essentially labour-saving, since it combines, in a compact form, all the materials for the washing and dressing of the wounds, and removes all the refuse from the wards.

At the Wills' Hospital, several years ago, I had flowing water, upon a simpler plan, introduced into the dispensary and operating rooms. By this method the brushes and sponges used in making the various applications to the eye can be more rapidly and thoroughly cleansed.

In the surgical wards of the Pennsylvania Hospital, this apparatus and method of cleansing wounds has been in operation for several months, and has given entire satisfaction.

NOTE.—Since the above was in type, I have found, in looking over the *Lancet*, just received at the Hospital, *Observations in the Military Hospitals of Dresden*, by Alex. Bruce, F.R.C.S., in which article reference is made to "irrigators employed in washing out the wounds, and especially the long sinuses left by the tracks of the bullets" as being of great value.

"They simply consist of a tin vessel, with an aperture near the bottom, to which is attached an India rubber tube with a bone nozzle."

"By means of this contrivance a continuous stream can be made to play over the wound, and thus effectually wash out the sinuses without the use of the sponge. I regret to say that the latter were, however, in far too constant use, and, as servants can never be got to attend to precautionary measures, these sponges were frequently carried from patient to patient, necessarily often loaded with the very poison of pyæmia."

Thus the continuous stream of water for cleansing purposes has been found of great service in the military hospitals at Dresden, but any good which might arise from this arrangement is entirely done away with, from the fact that the most uncleanly practice of using the same sponges in many cases was followed by most disastrous results; for, as Dr. Bruce remarks, "I cannot but attribute much of the very serious pyæmic epidemic from which we suffered to the want of sufficient caution in small matters of this nature."

1421 CHESTNUT STREET. November, 1866.

ART. X.—*Case of Aphonia successfully treated by the Extirpation of a Fibro-epithelial Neoplasm from the Vocal Cords*. By EPHRAIM CUTTER, M. D., Boston, Mass. (Read before the Middlesex, Mass., East District Medical Society, July, 1866, and, by its particular request, published as a communication from that body.) With five wood-cuts.

SEPTEMBER 14, 1855, I was consulted by Miss Anna M. Jewell, of Pepperell, Mass., 28 years of age; school teacher. For the last five or six years her labours had not been excessive. She had always been well, until the present difficulty of aphonia, which commenced in September, 1862, with a cold and hoarseness as the primary symptoms. At first this hoarse-

ness appeared in the morning, disappearing during the daytime. There was no soreness, dyspnœa, dysphagia, or severe cough. She was hoarse both in and out of school, could talk aloud with an effort, and sing until September, 1864. In the spring of 1865 her health became so much impaired as to oblige her to give up her school. Still, besides the aphonia, there was little apparent disease, save a general weakness, loss of appetite, and troubled sleep.

She had previously received the advice of a number of medical men, but at this time was under the care of Dr. Miles Spaulding, of Groton, Mass. He treated the case judiciously on general principles, employing topical remedies, such as the nitrate of silver, iodine, &c. The patient not being relieved, Dr. Hitchcock, of Fitchburg, Mass., was called in consultation, who recommended disuse of voice with an appropriate general and local treatment. The aphonia increasing greatly, the patient was referred to the writer for a laryngoscopic diagnosis, there being, however, no suspicion of there existing any new growth in the larynx.

Her appearance on September 14th, 1865, was that of blooming perfect health, with a cheerful, lively disposition. She complained only of complete loss of voice. Her physician, Dr. Spaulding, spoke of her loss of strength, tendency to anæmia, loss of appetite, and enfeebled condition.

On physical exploration by laryngoscopy with reflected sunlight, a neoplasm, extending across the vocal opening from right to left, was immediately disclosed. It appeared, at the first examination, near its thyroid insertion on the right vocal cord, as a sessile, oblong, bluntly digitate tumour of the size of a split pea. It was white, or of a pale light red, according as the growth was compressed between the vocal cords, or liberated from their grasp by the opening of the glottis. At this first examination it was only possible to decide the presence of the tumour. There was great difficulty in the exploration from intractability of the tongue.

26th. The examination was repeated, with results which entirely confirmed the former diagnosis. At this observation the sessile nature and cauliflower character of the growth were also well made out, and shown to Dr. Spaulding.

It was seen to be a sessile tumour, involving the thyroid half of the right vocal cord, and was thought to be non-malignant from the absence of pain and its benign aspect.

In relation to treatment, it was positively asserted that it could be removed by surgical measures—that this removal could be effected either, first, by laryngoscopic surgery, after a thorough preliminary education of the tongue and throat, which would involve considerable time—or, second, by its ablation by laryngotomy, with the advantages of speedy and complete removal and no loss of time. It was proposed to leave the decision of the operation to the patient, who was a lady of great refinement, capacity, and intelligence—we rather advising the external operation. The patient, following the natural aversion to the risks of having one's throat cut, decided to select the former course, with laryngotomy as a reserve. She returned home with instructions to repeatedly introduce foreign bodies into her throat, such as the fingers, spoon handles, ivory-tipped whalebone bongies, &c., in order to educate the throat to the tolerance of their presence.

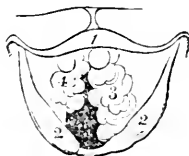
In October she came under personal supervision for about ten days, during which time she was exercised in manipulations of the tongue, position of head, and various kinds of illumination, in order to render the

parts tractable and fully expose the tumour. At the expiration of this interval she returned home, having made quite commendable progress. Her difficulty was not in nausea or intolerance of the instruments or manipulations, but in a persistent, upward and backward position of the base of the tongue, its convexity accurately fitting into the concavity of the arch of the soft palate, thus occluding the view.

Circumstances prevented the renewal of the treatment until December, 1865. She was daily practised upon till the education seemed complete enough for the practice of surgical interference.

In the mean time the seat and optical characters of the whole tumour were completely made out. It proved to be a sessile tumour, its seat ex-

Fig. 1.

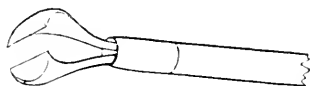


APPEARANCE OF THE GROWTH IN LARYNX BY LARYNGOSCOPE.—1. Epiglottis. 2. Arytenoid cartilages. 3. Neoplasm, covering the whole upper surface of the right vocal cord. 4. Do. on left vocal, leaving the arytenoid half uncovered.

tending over the whole upper surface of the right true vocal cord and the thyroid half of the left true vocal cord. Its surface was divided up into a large number of subglobose protuberances or bosses of varying size.

From its non-pedunculated character, it was proposed to remove it by Leiter's laryngeal forceps, with a double blade, modified from that furnished with the instrument which is adapted to pedunculated growths springing from the sides of the larynx, having the cutting edge on its lateral surface. The one contrived has a cutting edge on its bottom surface, much like the common tweezers (Fig. 2). This instrument closed would

Fig. 2.



Dr. Cutter's modification of sessile forceps, adapted to the removal of sessile growths.

be introduced into the larynx guided by the mirror and put in contact with the tumour. Then by relaxing the spring, the blades could be opened, and the tumour seized and portions avulsed by closing the spring and removing. Sometimes the grasp was so firm and the force applied to the growth so great that it could not be brought away without danger of breaking the instrument. The applications were conducted once or twice daily. As time was not a matter of consideration, the sittings were not protracted beyond the beginnings of nausea and retching, which almost always resulted. Some pieces were removed at almost every sitting, in all amounting to perhaps one-third of the bulk of the tumour. Other contrivances for the removal of the growth were employed, such as the Leiter's knife and Semeleder's sickle knife, besides various shaped knives of the author's invention. The difficulties with the tongue all this time were very great. It proved to be, indeed, a large, rigid, and unruly member. Spatulae of various sizes and shapes

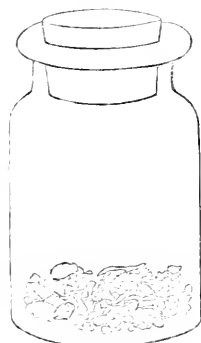
were tried without success. The persistency with which the tongue approximated the soft palate as well as the posterior pharyngeal wall was surprising and vexatious. Another difficulty was the general prone condition of the epiglottis. The best contrivance resorted to for obviating these difficulties was the inducing laughing, a condition in which the throat becomes open. When the patient was made to laugh, the tongue descended and the epiglottis became erect, and a good view could be obtained and then a portion could be removed. There was an unexpected difficulty in this case; her throat-education, instead of improving, rendered her tongue more unmanageable. So that notwithstanding a large portion of the polyp was removed February 3, 1866, and another large piece on the 9th, by the 14th the throat became so exceedingly irritable that it was impossible to secure any but the most unsatisfactory views, and the patient was advised to return home and afford rest to both herself and physician.

On her return three weeks afterwards, she complained of pain and weakness in the upper third of the front of her chest, and of an indescribable uneasy feeling of an insufficient supply of air. The aphonia was about the same. On laryngoscopic inspection the polyp was found to have increased in size, filling up more than one visible half of the larynx. It presented the aspect of a whitish cauliflower excrescence, deeply and irregularly indented into subglobose masses, presenting somewhat the appearance of a compactly pressed bunch of small grapes. It was sessile, and its base was attached to the whole upper surface of both vocal cords, except arytenoid half of the left vocal cord. The tongue had not improved in its tractability by rest, and it seemed as if it never could be tamed. It was then decided to remove the growth by laryngotomy, for the following reasons: 1. The size and sessile nature of the tumour. 2. The inability to obtain at will, successful and protracted views of the neoplasm. 3. Its rapid increase, threatening the viability of the patient. 4. The certain prospect of the immediate and complete removal of the growth, and consequent expectation of the more speedy recovery of health, if not of voice. 5. The benignancy of the neoplasm, implied from its appearance to the naked eye; the entire absence of pain, and the microscopical characters of the parts already removed, viz., simple connective fibres in the deeper parts and aggregated pavement epithelium at the peripheral portions.

The operation was advised more to save life than voice. In case the growth recurred the operation would be justifiable as exhausting measures of human interference.

March 30, 1866. The polyp was removed by laryngotomy at the farm residence of Mrs. R. Jewell, Pepperell. As the locality was remote, I provided myself with the following instruments and medicinal agents: *Scalpels*, with curved and straight edges; *bistouries*, sharp and probe-pointed, straight and curved; *forceps*, artery-curved, dissecting, dressing, laryngoscopic, polypus, self-closing, and self-fastening; *scissors*, straight, curved on edge and sides, and hawks-bill; *directors*, *curettes*, one silver tracheotomy tube; two double tined blunt hooks; two single tined toothed and untoothed hooks; some peculiarly shaped knives on curved terminations

Fig. 3.



Portion removed by laryngoscopic surgery—in vial. (Natural size.)

accommodated to the concavity of the larynx both sides; one of Smith's watch-spring tracheotomy dilators; *needles*, straight, curved, and three sided; silk and cotton ligatures, sticking-plaster; two of Charrière's finest pocket cases, embracing a large duplication of first class instruments. One pound Squibb's ether; one pound common ether; chloroform fl $\overline{3}$ iv; persulphate of iron $\overline{3}$ ij.

The day was clear, cool, and airy. At 10.15 A. M. the operation was commenced by administering ether on a sponge placed in the apex of a loosely-formed cone made of a common newspaper. A contrivance that worked admirably, and I believe was suggested by Dr. Spaulding. There were present Drs. Miles Spaulding, of Groton; George F. Shattuck, of Pepperell; George M. Howe, of Framingham; and W. A. Webster, of Groton.

The patient was placed in a low wooden, old-fashioned arm-chair with the front legs elevated about four inches. The back of the chair reached to the shoulders so that the head could be easily bent backwards. When the patient was completely etherized, steadying the parts with the fingers of the left hand, I made, with curved bellied scalpel, an incision in the median line, about three inches in length, from the hyoid bone downwards, cut carefully through the fat to the fascia which was elevated by the forceps, nicked, a director entered, and the parts cut with a sharp-pointed bistoury. Then with director, knife point and handle, and fingers the tissues were cut, and retracted from the median line, until the hyo-thyroid membrane, the thyroid cartilage, the thyro-ericoïd membrane, the ericoïd cartilage, and the three uppermost rings of the trachea with their membranous interspaces, were fully exposed. The exposure of these tracheal rings was made, so that, in case it should become necessary, the tracheotomy tube might be early introduced by simply separating the lower part of the wound and incising the trachea.

It was deemed proper by myself to abandon the use of the tube, if possible, on the principle that foreign bodies in the air-passages should be avoided, and also from the consideration that the new growth when removed would leave more space for the air than there was before the operation. In case of dyspnoea from inflammatory exudations, the introduction of the tube would be easy. As it happened, the tracheotomy tube was not even required to be used at all.

When it is understood that it is the approved custom of surgeons in like cases to perform tracheotomy and introduce the tracheotomy tube for twelve or fourteen days previous to the performance of laryngotomy and the removal of the growth, the particular significance of this modification will be made to appear. It avoids two operations, takes less time, and in this case would have been absolutely unnecessary.

At this stage the erico-thyroid artery was tied. There was no sign of the isthmus of the thyroid gland. Some ten or fifteen minutes were then spent in waiting for the complete cessation of hemorrhage, which was not very considerable. The thyroid cartilage not proving ossified, the sharp point of one arm of a small pair of scissors curved on the narrow edge was inserted with the concavity upwards in the middle of the erico-thyroid membrane, until it disappeared up to the shoulder in the larynx. A single closure of the scissors sufficed to lay the larynx open. The advantages of the use of scissors were deemed to be the avoidance for admission of air until the cut was made, as the instrument filled the wound completely, the celerity of the cut, the greater nicety of cutting in the median line, as the

direction could be completely governed with an instrument so familiar as the scissors. The wound was enlarged by the same instrument up to the hyoid bone. The parts were then held apart by two assistants with two-tined blunt hooks. They answered perfectly, one time dipping in out of

Fig. 4.

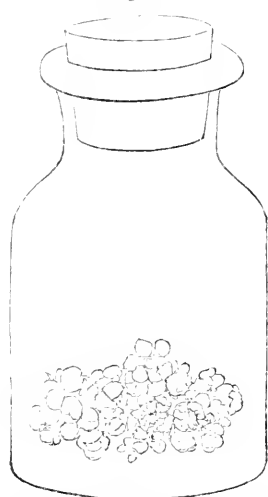


One of the two-tined blunt hooks for holding apart the laryngeal opening, improvised and made by the writer from common dinner table forks.

the way in the larynx above the ventricular band, and the other disappearing below the vocal cord. The bluntness of tips prevented penetration into the parts. The interspace was occupied by the growth. This form of hook was employed by my father the late Dr. B. Cutter, as a powerful, cheap, and useful hook in post-mortem examinations. It is figured in *Heister's Surgery*, London edition, 1757, vol. i. tab. viii. fig. 3. Its use in this operation is, I think, original with the writer. At the instant of opening the larynx the air rushed in with a whizzing noise. Coughing was excited, but ceased after the expulsion of a considerable quantity of blood which was propelled through the opening to the distance of several feet in front. After the coughing the respiration was very tranquil. The larynx was quiet and manageable, very fixed, probably from the hooks and partly from the fact that a warm moisture was maintained in the room by evaporation from a large tin pan on the stove not only during the operation, but also during the convalescence. The polypus was divided and bleeding. It appeared to fill the whole rima glottidis in the form of a cauliflower exerescence subdivided in small globose bodies like a very diminutive bunch of grapes. On the larger lobes were regular lines, some of them dividing up the surface into quarters and some into six or seven pieces, like the division of a cut pie. It was well disclosed, and was exceedingly accessible to the application of instruments besides its fixidity. The growth was readily removed in a few pieces by seizing with forceps and excising with scissors curved on the side and edge. My own special knives were not used. The opening was repeatedly cleansed of blood and mucus, by means of small cubical masses of sponge held in forceps. Besides this quantities of blood and mucus would be very forcibly expelled, after which all would be quiet. The etherization was maintained at intervals through the opening. No ulceration or other abnormal appearance was detected in the larynx.

After having fully removed the growth, and after my associates had inspected the parts and concurred with my conclusion as to the completeness of the ablation, the seat of the growth was freely touched with solid nitrate of silver. The hooks were withdrawn, the wound held

Fig. 5.



Represents the neoplasm removed by the laryngotomy, in the bottle (natural size).

together, and breathing was found to be easily maintained per orem. The patient was allowed to recover from the etherization, and we waited to see if there should be any hemorrhage or other untoward event. On return of consciousness, vocalization in a whisper was easily effected.

The two parts of the severed thyroid cartilage at the section overrode each other alternately with each phase of the respiration, but it was thought unnecessary to put a suture through them, as it was supposed that the sewing of the skin and compression with adhesive straps would hold them in *situ naturale*. The event proved this to be correct. The wound was closed by five white sewing-silk sutures, supported with adhesive straps, and covered with a dry compress held in place by a bandage. When the patient coughed, air passed out of the opening between the stitches. Put a piece of cork between the teeth to increase the opportunity for the free egress of air. Respiration was easy. The patient was then undressed and put to bed, and the whole operation, from the time of commencing to etherize to the last act, occupied about two hours. 7.30 P. M. Pulse 100; slight headache; deglutition possible but difficult; throat sore on outside, not on inside; patient cheerful; looks well; gave ice, rice broth.

31st, 9.45 A. M. Pulse 92; respiration quiet; skin and tongue moist; countenance and spirits good; expression natural; cough very little; wound swelled and sore outside; not much soreness inside; deglutition comparatively easy; some pain in upper part of chest in front; only on coughing does air pass out the wound; not much oozing of serum; gave tinct. veratrum viride gtt. vj, every two hours as a prophylactic against surgical fever. 11 P. M. Comfortable; pulse 92; skin moist; throat sore; coughs but very little.

April 1. Quiet, pulse 80; breathes easily; no appetite.

2d, 6 A. M. Removed two or three sutures; I left her in the charge of Drs. Spaulding and Shattuck, and returned home, and Dr. S. subsequently sent me the following diary of the progress of the case:—

"April 2, 4 o'clock P. M. Patient very comfortable: pulse 72, rather feeble; wound doing well; had taken but little nourishment; did not like beef-tea; ordered chicken broth.

"3d, 10 o'clock A. M. Patient had rather a poor night: sweat on going to sleep; suffered evidently for want of nourishment; had taken nothing during the evening or night; had taken some chicken broth in the morning, and at time of visit was feeling better than any time since operation; wound looking well, removed the remaining suture; occasionally a little air escapes from lower part of wound; pulse 74, good; countenance looking better than since operation.

"4th, 10 o'clock A. M. Patient had a good night, slept more than any night since operation; since last visit has taken more nourishment, chicken broth and a little rye paste, with cream, also drank a little porter; set up half an hour this morning; pulse 80, increased a little probably by sitting up; wound looking well; patient looking better than any day since operation.

"5th, 2 P. M. Patient had a sleepless night, owing, I think, to *reading* too much the day previous; pulse 80, good; tongue more furred; bowels had not moved for several days; ordered an enema; as the breath continued fetid, gave her chlorate potassa.

"6th, 3 o'clock P. M. Found patient dressed and sitting up; had been up considerably during the day; had passed a better night, slept considerably; felt better after operation of injection the previous evening; wound looking well, upper third healed by first intention; but very little air escapes,

and only, if at all, on making the effort to clear the throat, or coughing; breathing very free and easy; phonation quite as good or better than before operation; appetite poor, although she takes more nourishment and is gaining strength.

"9th. Patient sitting up; pulse 72, good; tongue coated; no appetite, although feeling stronger, but still quite weak; wound healing well; phonation better. Ordered compound tinct. Peruvian bark.

"10th. Patient has been down stairs; feeling stronger; tongue coated; wound healing. Ordered quinia instead of tinct. bark, also fluid magnesia and lemon juice.

"12th. Patient down stairs; tongue cleaning; rests better at nights; says she could not talk so well yesterday; was fatigued day previous with visitors; wound almost healed, all except a little space in the middle where I had touched the granulations with nit. silver; no air through wound for several days; rode out half a mile; phonation not quite as good as on April 9th (fourteen days after operation).

"The weather was very pleasant at the time of my visit, and I invited her to get into my chaise and take a ride. She enjoyed the ride much. She is getting along well, but is weak. She was more prostrated before the operation than any one not well acquainted with her might suppose. She is one that does not complain unless feeling very badly. There has been but very little suppuration; the parts look well.

"7th. Patient doing well; gaining strength; tongue cleaning; wound entirely closed; tongue quite clean; appetite better, although not very good; rode out yesterday, and walked a short distance; phonation better; feels stronger; is still unable to speak, except in a whisper. I think she will talk better as she gains strength. The skin adheres to the trachea, at the lower part of the wound, so that in swallowing it lifts up the skin. The wound has healed very nicely.

"24th. Patient's health is gradually improving. She walks out and rides; made a call on Saturday, and got rather tired. She is not very strong, although she has been taking quinia, pyrophosphate of iron, and porter. She will not be strong enough to visit you for a week or more, I think. Phonation remains about the same, no better than two weeks ago. Breathing seems free. I have not looked into her throat yet. I think her general health was more prostrated previous to the operation than we thought."

May 3. Saw patient at my office. General appearance good; still there is some emaciation and weakness. She sleeps quietly and breathes easily. Says she feels as well as she ever did. Inspection of throat outside revealed a clean, smooth linear cicatrix three inches in length, and in the median line. Upon swallowing there was an evident transverse wrinkling of the skin in front of the neck, due to a small attachment of the skin to the trachea. There was no perceptible projection of one side of the thyroid cartilage over its fellow, and the cartilage felt firm.

Laryngoscopy.—The rima glottidis was small, but not having seen it in health, I could not tell whether it was normal or not in size. Upon the right vocal cord, near the thyroid insertion, was a slight prominence of small size. Colour of cords, reddish. They were symmetrical in movements and divarication.

The aphonia exists, to the disappointment of all concerned. Dr. Spaulding thought that when the patient had rested thoroughly from talking (and he said she had talked a great deal), and had recovered her general

health fully as it was before this difficulty, her voice would return. Once or twice since the operation she has spoken out nearly aloud. Touched the prominence with solid nitrate of silver. Advised cessation from talking, engagement in active and passive exercise, which were adopted.

30th. Dr. Spaulding personally informed me that patient is able to speak aloud.

Under date of June 22d, 1866, Miss Jewell writes: "I am talking with a hoarse loud tone, except when I get tired." This resulted after she was advised to use her voice and to employ elementary sounds, the same as a child does when learning to talk.

July 9. Miss Jewell came into my office speaking out in an audible tone. Her voice is peculiar, having a timbre of a puerile character, but still powerful enough and phonic enough to be very satisfactory. She says it is not "her voice." Thinks it improves with time. Laryngoscopy was as difficult as before from the unruly obstinate tongue. Still the vocal cords were plainly seen to be smooth and almost free from excrescence. The rima-glottidis was rather narrow antero-posteriorly, and it was thought that this narrowness would preclude any but a childish voice.

The longitudinal cicatrix has contracted to two and one half inches in length. The general health is not quite so good as might be desired. There is debility and muscular weakness, indicated by getting tired easily. The patient was encouraged to use her voice reasonably with the idea of further development by physiological exercise.

Nov. 19. Under this date Miss Jewell writes, "I am very well," from which we infer that the cure has remained permanent to this date.

Résumé.—The points of interest in the case may be stated as follows:—

1st. The discovery of an organic cause of the aphonia by the laryngoscope.

2d. The modification of Leiter's forceps and the employment of the improvised blunt two-tined table-fork hooks.

3d. The omission of tracheotomy and tube.

4th. The denuding of the three upper tracheal rings, with their membranous interspaces preparatory to the possible use of the tube subsequent to the operation.

5th. The apparently complete restoration of voice and health which crowned the operation with success, and which appears providential, inasmuch as it was long delayed after all human means had been exhausted, and as several of similar cases have not been followed with such happy results.

ART. XI.—*Gunshot Wound of the Skull: Recovery.* By BENJAMIN H. CHENEY, M. D., of Joliet, Illinois.

On the 31st day of September, 1865, J. B., a stout and robust farmer's boy, aged 17 years, was out hunting with a double-barrelled shot-gun. He had already discharged one barrel, when, in climbing over a fence, he either caught the hammer in a rail, or, as he himself says, let fall the gun on its breech to the ground with such force that the remaining barrel went off.

His head was at that time directly over the muzzle, and but a short distance from it, and, of course, received the charge.

The patient resides some sixteen miles from this place. When I first saw him, ten hours after the accident, he was lying comatose, with heavy, stertorous breathing, and slow, full, and regular pulse. He manifested a constant disposition to turn the head to the side of the injury, in such a way that the brain protruded from the wound. The left eye was closed from cedematous tumefaction, but the globe was uninjured.

On examination it was found that the whole charge had struck him just at the outer edge of the left superciliary ridge, and had passed directly, upwards, backwards, and inwards toward the junction of the sagittal and coronal sutures, through integument, bone, and brain-substance, carrying away of the latter, as near as could be judged, at least a tablespoonful. The integument was torn entirely away for the space of nearly two inches, and a piece of bone as large as one inch square, but of course very irregular in shape, was also gone. The wound was about three inches in length, extending to the coronal suture. In its track the integument which remained was much torn, and the bone badly comminuted. Two distinct fractures of the skull, radiating from the wound, were visible: one, short and transverse; the other, almost continuous with the track of the wound, and extending further than it could be traced into the left parietal bone. The tissues and integument for some distance around were, of course, very much blackened by the powder.

The hair having been shaven from the vicinity of the wound, a small and entirely detached spicula of bone was removed, and a single suture taken in a somewhat extensive rent of the integument, with a view of lessening the size of the wound, and restraining the brain-substance from protrusion. Beyond this, the only treatment adopted was the application of cloths wet in cold water, and the direction that the head should be kept propped by pillows in such a way as to prevent the patient from turning it to the left side. Directions were also given to feed the patient with a proper allowance of essence of beef, animal broths, &c.

Some three weeks later, at which time I supposed either that the case had terminated unfavourably, or that medical advice from one of the towns nearer the patient's residence had been sought, the father presented himself, and informed me that the boy was fast recovering, and had, during that week, recognized his family and friends. No treatment other than that mentioned above had been instituted. Suppuration had taken place extensively, and the wound was healing kindly. A few directions regarding quiet, avoidance of excitement, diet, and the regulation of the bowels were given, and dry cloths ordered in place of the wet ones, which were still being used. No other change or addition was made to the treatment.

On the 8th day of June, 1866, the boy himself called to see me. The wound had entirely healed; the cicatrix being about three inches in length, and of a size and depth to readily accommodate the index finger. The pulsations of the brain under the tissue of the cicatrix could be distinctly seen at a room's length from the patient.

Some points in his physiological condition at this time are of interest. The patient's general health had been very good since his recovery, so much so that he had been at work ploughing and sowing during the spring, had been out hunting again, &c. A singular feature was that his appetite when he was *not* at work was excellent, and he ate his full ration

with the others who were performing their usual daily labour. But on the days when he worked, he had no appetite whatever. There was no nausea or loathing, but simply a positive disinclination for food (anorexia), so that he could take nothing unless it was to "sip a little tea, or take a bite of toast." Probably some disturbance in the equilibrium of the circulation in the encephalon, induced by the active exercise of work, and consequent upon the loss of brain-substance, was the cause of this condition.

The patient also found the locality of the wound very susceptible to the influence of temperature, and was obliged, for comfort when he went out, to wear a silk handkerchief over the cicatrix, and to pull his hat down over the left eyebrow. When he stepped down from one height to a lower, even a slight distance, he felt a perceptible jar in the head. Otherwise he experienced no discomfort from the injury.

Not the least interesting were some of the effects of this injury upon the brain as the instrument of mental manifestations. Previous to the accident the patient had been able to read and write, had studied arithmetic, &c., and was accounted among his neighbours bright and intelligent. Since his recovery it was found that he had forgotten all these. He could not even read simple monosyllabic words. He knew some of the letters of the alphabet by name, but evidently connected with them no phonetic sound. For example, when I asked him if he could not spell such words as "eat, dog, &c.," he replied that he "could sometimes, but did not know why." His success in certain cases seemed to depend either upon chance, or upon some reminiscence or association wholly distinct from a conclusion arrived at from the sound of the letters. To him e-a-t might as well spell *tree* or *elephant* as anything else. He seemed equally unable to deduce conclusions from given premises, or to connect cause with effect even in the most trivial cases. His memory was distinct in proportion as the events were recent. He well remembered all the incidents of the accident, and things that had taken place just before. Events, however, dating years back were vague, and, to some extent, dream-like in his mind.

The faculties of perception, memory, and reproduction (recollection), remained in certain degrees, their strength being in the order here given, while nearly all power of elaboration or comparison seemed gone. The latter faculty (the elaborative, or power of comparison, including judgment and reasoning), is classed by Sir William Hamilton as the highest state of the mind. For its exercise, therefore, a full quantity and due equilibrium of the brain is necessary, while other faculties can be exercised to some degree with less and under different conditions. As an injury of this kind may be, to some extent, an exponent of certain pathological conditions of the brain, imperceptible, save in their mental manifestations, so does it also, so far as it goes, afford ground for the presumption that the order of the intellectual faculties, usually given by philosophers, has a physiological as well as a psychological basis.

TRANSACTIONS OF SOCIETIES.

ART. XII.—*Summary of the Proceedings of the Pathological Society of Philadelphia.*

March 14. *Constriction of Ileum by Appendix Vermiformis.* Dr. THOS. H. ANDREWS exhibited the specimen and read the following report:—

John Hagy, æt. 55, native of Ireland, labourer, was admitted into surgical wards of Pennsylvania Hospital Tuesday, March 6th, 1866, with, as he said, a rupture of the left side. The history which he gave was as follows:—

The tumour first made its appearance about five years ago, being produced, as he said, by heavy lifting and straining. The tumour was small at that time, and there existed but very little pain, causing him no material inconvenience; it was easily reduced, but in consequence of his never wearing a truss the bowel remained down constantly, excepting whilst he was in the recumbent posture.

His condition remained the same up to within one year ago, when he began to experience trouble and pain at the time of reduction. Last four or five weeks the trouble has increased, the pain becoming more aggravated, tumour harder in consistence, and remains down all the time, both sitting or standing up, and lying down.

About eleven days before his admission into the hospital, the pain has been almost insupportable; the tumour more sensitive to the touch; complete loss of appetite; and what little he was able to eat was vomited soon after; last day or so vomiting has been incessant, which vomit consisted of a yellow fecal-like substance. The pain now extends throughout the belly; has been seven days since he has had a passage.

On admission, he was in a very debilitated condition. Pulse was not very frequent, but feeble and compressible; tongue coated with a yellowish coat, with reddish edges and tip; countenance anxious; peculiar drooping of the left eyelid; pupils somewhat contracted; sunken features; clammy skin; heart sounds feeble.

On a physical examination of the parts we found a tumour, about the size of an English walnut, more oblong in shape, just over the left external inguinal ring and spermatic cord, and just above the left testicle; on compression it gave to us a peculiar crackling sound, which sound is said to be, by some authorities, indicative of inflammation of the hernial sac; it also had a peculiar feeling of hardness, which, upon applying pressure, appeared to leave an indentation. He informed me that many attempts at reduction had been made before his admission into the hospital, but without success.

I ordered for him a warm bath, then made an attempt at reduction whilst in the tub, but was unsuccessful.

After being placed in bed, I ordered for him forty drops of laudanum by enema, and then sent for the attending surgeon, Dr. Agnew.

On his arrival, the tumour was cut down upon, the different layers successively taken up and divided, until we arrived at the sac; the adhesions that surrounded the sac were very hard, evidently of long standing. Upon cutting into the sac it gave vent to about one drachm or two of fluid, but no bowel was there; the finger could be passed into the sac, up through the inguinal ring into the abdominal cavity, and come in contact with the bowel; now it remained a query whether the symptoms of strangulation of the bowel which existed in him were caused by trouble at some other point, either near or distant, or that the bowel supposed to be strangulated had been reduced by the taxis either before or after his admission into the house, and the sac which contained the bowel had, in consequence of its firm adhesions and distended appearance (both from its thickened walls and containing fluid), given to us the appearance of non-reduction.

Again, the walls of the sac were cut loose from the surrounding attachments, and a ligature thrown around its constricted portion and the remainder cut off. Wound was brought together by ordinary interrupted suture—very little hemorrhage during operation, but one ligature was required.

A tent was inserted in order to secure union from the bottom, then a compress and bandage (spica), &c. An anodyne was immediately ordered; also 1 gr. opium pill every second hour during night, and in consequence of his depressed state milk punch, a wineglassful every second hour.

Wednesday, March 7th, 8 A. M. Passed a very restless night; did not suffer much pain, but the vomiting of the peculiar yellow matter still continued. Pulse feeble, 112; temperature in axilla $101\frac{1}{2}^{\circ}$.

12 M. The pain has increased, and the swelling and tenderness also augmented, for which he was ordered a blister eight by sixteen over abdomen. Tongue moist, but coated heavily with a yellowish substance somewhat resembling starch; pupils contracted; conjunctivæ congested; says he feels more comfortable since the operation; wound undisturbed.

6 P. M. Pulse still very feeble, 103; temperature $101\frac{1}{4}^{\circ}$; symptoms remain about the same; still vomiting.

Thursday, 8 A. M. Pulse feeble, 112; temperature 100° ; vomiting continued through the night; no increased swelling or tenderness of belly; he complained of feeling full, wanting a passage, for which he was ordered an injection, which was of no benefit; the fluid could not be retained; as soon as syringe was removed it came out with a rush, containing little or no feces, and the piston, if left alone, is pushed by fluid injected; this made us think there was some intestinal obstruction.

6 P. M. Pulse 108; temperature 100° ; no marked change.

Friday, 8 A. M. Pulse very feeble, 108; temperature 101° ; great increase of pain; no increased swelling; wound looks well, but little discharge, quite healthy in appearance; hands and feet cold; tongue still heavily coated; anxious expression, Hippocratic; pupils very much contracted; vomiting still continues and did throughout the night; medicine affording no relief; heart sounds feeble; left eye lost its glassy appearance, a film over it; constant tossing from one side to the other, as if in great pain; skin shrinking, approaching to cutis anserina. Ordered morph. sulph. gr. $\frac{1}{8}$, with hyd. chlor. mite gr. $\frac{1}{6}$ every hour.

5 P. M. Pulse not perceptible in wrist and scarcely in the axilla, 56; temperature $100\frac{1}{2}^{\circ}$; respirations shallow and frequent, 40 to 48; extremi-

ties still very cold; constant groaning and tossing about; increased swelling in belly; great thirst; vomiting incessantly; heart sounds scarcely perceptible, but slight expansion of the lungs; passed catheter, no urine in bladder; skin livid; evinces pain on slightest touch, in fact, on the approach of any one; features sunken. 6 P. M. Moribund.

Death twenty minutes past six, Friday, March 9, 1866.

Autopsy three hours after death.—Peritoneal investment of intestine minutely injected and very dry, but sticky from slight exudation of coagulable lymph. No appearance of any part of the bowel having been strangulated in a hernial sac. The adhesions of intestine to iliac fossa and elsewhere were thick and tough, and at one point on left side of pelvis above the obturator foramen a loop of ileum was adherent. The small intestines were distended with light yellow fluid feces down to within four inches of the ileo-cæcal valve; below that point, it and the whole large intestine were greatly contracted. This constriction was caused by an adhesion formed between the end of the vermiform appendix, which was twisted back and to the left, and a loop of the ileum. This adhesion, one-third inch thick and one-half inch long, bridged the ileum four inches above the valve, so as to compress it against spinal column and completely occlude it. The mesentery was thick and hard, and the mesenteric glands enlarged and firm.

March 28. Cancer of the Stomach with Latent Symptoms; similarity to Cirrhosis of the Liver; with Remarks on the Temperature of the Body in Cancerous Affections. Dr. DA COSTA read the following:—

P. F., æt. 52, born in Ireland, and a labourer occupied in picking slate and carting dirt outside of a mine in Schnylkill Co., was admitted into the Medical Ward of the Pennsylvania Hospital, on the 31st of January of this year. He was one of those stolid and somewhat stupid persons, from whom it is difficult to obtain a connected and intelligible history of their ailment; but questioned closely several times, he stated that he had enjoyed good health up to four weeks previous, when he was troubled with pain and soreness in the supra-pubic region, and a pain in the left hypochondrium. He attributed these pains to the constant bending over in picking slate, and as regards the pain in the left side, at least, declared that it had gradually worn away. Shortly after the uneasy and painful feelings in the abdomen were noticed, he became aware that his feet and legs were swollen. For a few days this swelling disappeared in the mornings, and particularly after using frictions, but subsequently it became permanent, and then tumefaction in the abdomen attracted his attention. Very shortly afterwards he observed that the quantity of urine he passed was decreased; and that the urine was high-coloured and burned in passing.

The man was of small stature and rather thin; and the dropsical effusion was not confined to his lower extremities and abdomen. A note of his condition, taken on the 2d of February, shows clearly that thoracic dropsy formed part of the general anasarca. The note says: "Skin dry, and slightly heated, not icteroid; conjunctiva dull, not yellow; pulse 84; tongue moist, and coated with a thin, yellowish fur, particularly in the centre; appetite impaired; one or two passages daily, which are stated not to be loose; some nausea, but no vomiting; a sense of fulness, but no pain in the abdomen, nor was there tenderness. The abdomen is moderately distended; fluctuation distinct. The hepatic dulness does not fairly

extend to the lower margin of the ribs, where resonance is discerned. The feet are markedly œdematous, but not the upper extremities. An examination of the chest shows a very decided bulging on the left side; not, however, in front; rather laterally, from the left axilla downwards. But both laterally and in front, there is decided dullness on percussion, which is also elicited posteriorly; though the line of dullness there is on a much lower level than that in axilla. The dullness in front does not extend to clavicle, scarcely above the third rib. Respiration is very feeble, laterally and posteriorly. The impulse of the heart is feeble; the sounds extremely so, especially the first sound, which at apex is barely audible. The cardiac percussion-dullness, so far as the effusion in the pleura permits us to judge, is increased; and this is attributed to co-existing pericardial effusion. There is slight cough; no expectoration. The urine has a sp. gr. of 1020, is acid, contains no albumen." The man was placed on low diet; iodide of potassium, 5 grains three times daily, was given; iodine was painted over the chest; and the kidneys were acted upon by an infusion of juniper berries. Counter-irritation over the hepatic region, by means of iodine, was also directed. But little if any improvement took place under this treatment. Indeed, as on the 8th of the month, the patient was troubled with diarrhœa, having from four to six loose passages daily, the iodide was suspended, and small doses of paregoric were occasionally given to keep the diarrhœa in check; though no attempt was made to stop it entirely, as it evidently relieved the abdominal tension and swelling. The juniper berries acted freely as a diuretic, and were kept up for a considerable time. The iodide of potassium was twice resumed, and administered for a week at a time, but it evidently did not suit him. On the 12th of the month, and prior to the iodide being resumed, many rales in his chest and a severe cough, indicated an expectorant, and a mixture of squills and compound liquorice mixture was chosen. The cough was much ameliorated, and it and the expectoration gradually ceased, while the rales passed away. Subsequent to this he was placed on Basham's diuretic iron mixture, and all other medication was stopped.

Such, in a few words, was the treatment in the main pursued. And during its continuance for six weeks no very striking change took place in the more prominent symptoms. There was always more or less tendency to looseness of the bowels. The dropsy diminished somewhat, and particularly did the pericardial effusion change; for from the 5th of March on, note after note reiterates the statement of decreasing dullness in the præcordial region, and increasing distinctness of the heart sounds. The effusion in the pleural sac lessened; but much œdema of the legs and feet remained. The tongue was clear, and red, and fissured; the abdomen distended, not tender to the touch anywhere; the circulation in the abdominal walls appeared to be normal, and the veins were distinct and somewhat prominent, though by no means to a very marked degree. The spleen was not large. On March 8th, the evening temperature, as measured with a thermometer in the left axilla, was $99\frac{3}{4}^{\circ}$ Fahr. with a pulse of 96, and respirations 20. Neither then, nor until the patient's death on the 26th of March, was there hectic; the thermometer always marked under 100° . But though no hectic, there were steadily progressing emaciation and debility. His pale, unimpressive face became more and more wan, perhaps of slightly yellow tinge, and he seemed to be fully impressed with the idea that he was not doing well. Yet his appetite

remained fair; there was some nausea; but no vomiting, acidity or fetor of breath, delayed digestion, or any special gastric disturbance occurred. Nor was there abdominal pain, if we except attacks of colicky pain which in the last weeks of his life, certainly in the last week, came on very constantly, particularly in the evening, and being referred to the lower part of the abdomen which then felt hard and tense, and yielding very readily to small doses of paregoric and lavender, were attributed to flatulent distension of the bowel. The stools were rather light-coloured and of softish consistency. The urine, several times examined, showed when tested with nitric and sulphuric acids, the presence of bile pigment. No peculiar symptom preceded his death; he died from exhaustion, and somewhat unexpectedly; for though he remained for the most part in bed, he was able to be about the day before, and death certainly did not appear so near at hand.

Autopsy, ten hours after death.—Body much emaciated; abdomen prominent. *Left pleural cavity* contained three pints of yellowish serum. Lower lobe of left lung collapsed, and bound to diaphragm by strong old adhesions, and less firmly to lower part of costal pleura. Upper lobe crepitant, but attached at lower edge to the opposed surface of costal pleura; the apex of the lung was also adherent. On the right side of the chest were found a few old adhesions, but no effusion existed. Both lungs highly pigmentary. The *heart* much smaller than normal; the pericardium was loose, and on its cardiac surface was a dense white spot, about one inch in diameter. The pericardium contained somewhat over an ounce and a half of fluid. The ventricles were of normal thickness and dimensions as compared with the size of the whole heart; the left ventricle contained a clot.

On opening the abdomen two quarts of a yellowish serum, without flocculi of lymph, were evacuated. The liver scarcely reached to the margin of the ribs; its lower edge was thin and the entire organ small, as indeed were all the other viscera. It weighed rather above three pounds, was of a very dark reddish-brown, and its consistence somewhat increased, though it could be torn. It exhibited a granular section, but nothing to the naked eye like the appearance of cirrhosis. Its capsule was much thickened and tightly adherent to the diaphragm, and to the liver structure itself. Gall-ducts pervious; gall-bladder contained a small amount of bile, but no stones. *Spleen* normal; tightly adherent to fundus of stomach, and imbedded in thickened peritoneal folds, though its own capsule was not materially altered. *Kidneys* small and anæmic. *Supra-renal capsules* healthy. *Bladder* full of pale urine, but healthy.

Neither the *stomach* nor *intestinal folds* were visible on opening the abdomen, being agglutinated into three masses, each covered anteriorly by a thick, shining, whitish membrane. On dissecting this off no gastrocolic omentum was found; the stomach was tightly adherent to the colon, the central portion of which could be recognized through the thickened peritoneum which covered it. The stomach when inspected, as it lay underneath the dense white structure, looked like a smooth, non-nodulated mass. It was tightly adherent, the adhesions forming part of the mass, to the under surface of the left lobe of the liver, as far as the transverse fissure and the portal vein, the hepatic artery, as well as the duct being involved in these dense adhesions. The duodenum was less united to surrounding structures than were other portions of the intestinal tract. The pancreas was perfectly healthy, and strongly adherent to the stomach. There were also along the lesser curvature of the stomach and at its

fundus near the spleen several hard whitish glands, varying in size from a pea to a hazlenut. All these structures and adhesions formed the upper of the three masses. The second was composed of the cæcum and lower part of ilium agglutinated by tenacious adhesions and covered by the whitish membrane above described; the third mass was composed of the sigmoid flexure of the colon and the remaining portion of small intestine similarly adherent and covered.

On laying open the *stomach* it was found to be much contracted, measuring, as ascertained by Dr. William Pepper, only five inches from fundus to pylorus, and three from cardia to corresponding point on greater curvature. Its serous coat was so adherent to the thickened membrane as to be inseparable, and, indeed, constituted part of it. All the succeeding coats, excepting the mucous, were converted into a dense uniform mass, having a whitish scirrhus appearance. This morbid structure varied in thickness from one-fourth to half an inch, with the exception of two masses along the greater curvature, which encroached upon the cavity of the organ, and measured in thickness about an inch and a quarter. The abnormal condition of the walls was gradually lost, as the cardiac and pyloric orifices were approached, and these orifices were perfectly pervious and not in the least contracted. The mucous membrane, properly speaking, existed only for half an inch around the cardiac orifice, and about an inch and a half around the pyloric; in the latter portion it was highly rugous, conveying the impression of being hypertrophied. Nowhere was the mucous membrane ulcerated, but its normal appearance was obliterated at all parts except the extremities of the organ mentioned, presenting to the eye a uniformly whitish, dense, smooth membrane, wholly unlike the irregular, yielding look of the mucous coat of the viscus in health, and without any granular depressions.

The *intestine*, as already stated, was agglutinated throughout its entire extent, so that the most careful dissection was requisite to separate the folds. The intestine was contracted in all parts except the duodenum; the coats in the small intestine, with exception of the peritoneal, appeared healthy. In the large intestine the submucous tissue was in portions thickened and dense, presenting, though to a much less degree than in the stomach, a scirrhus appearance. The mucous membrane of the small intestine looked healthy, there being no enlargement of the solitary glands or of Peyer's patches. In the large intestine, however, towards the cæcum, one or two irregular ulcerations were perceived, about half an inch in diameter, with depressed edges, and having the submucous tissue for their base. Scattered over the mucous membrane were thrush-like bodies of grayish floccular look, roundish or stellated in shape, varying in size from a pin's head to a small bean, and moderately adherent to the mucous membrane, which under them was superficially ulcerated. Similar bodies were found on laying open the œsophagus. The mesenteric glands were not enlarged.

Microscopical examination.—Sections of the *liver* examined microscopically, exhibited liver cells of normal size, and very granular. Most of the granules were like brownish pigment, and evidently discoloured by bile. The granular masses noted as discernible to the naked eye, consisted of cells which were pre-eminently discoloured, and displayed the appearances mentioned. In no field was there free fat.

Sections from the thickened wall of the stomach, those portions which presumably corresponded to the submucous coat presented a cancerous structure of extraordinary distinctness; large cells with several nuclei and

clearly defined nucleoli abounded; and instances of cells containing five or more large nuclei were not uncommon. The rugous portion of the mucous membrane found in the neighbourhood of the pylorus, showed no increased fibrous tissue; it was in parts granular, and some of the cancerous elements had here and there commenced to invade its texture. Its glandular structures did not appear to be altered; yet no sections having particular reference to the glandular apparatus were made. At other parts of the stomach the smooth dense texture which occupied the seat of the mucous membrane, exhibited in sections taken from its uppermost surface, only here and there some remnant of the composition of mucous tunic, but more generally much fibrous tissue, and very granular fields with cancerous elements shining through, and evidently placed beneath.

The small glands surrounding the stomach were markedly cancerous; in the granulations in the peritoneum and outer intestinal walls were also discerned round or ovoid cells, with large distinct nuclei, and even nucleoli, delicate, and finely granular. These cells were much larger than exudation corpuscles, and were not found in anything like the abundance they were in the gastric cancer. Indeed, the mass of the intestinal granulations and thickening was composed of fibrous tissue. The thrush-like bodies within the intestine presented a very peculiar constitution. They consisted for the most part of free granules, a degenerate cell structure of small, granular cells, and a fibrillated, but not a fibrous membrane. In one specimen this fibrillated structure abounded, and the small, granular cells were arrayed in loops and bunches, an attempt at a villous formation, in which, moreover, a very little, loose fibrous tissue was merged. The cells which entered so largely into the construction of the thrush-like bodies, were not only very granular, but indistinctly, or not at all nucleated, and utterly unlike those found on the outside of the intestine, or in the walls of the stomach. They were evidently not the cells of a cancerous growth. But besides them could be seen in three or four specimens examined, a few delicate, round or ovoid cells, much larger, nucleated, and of a tint and size corresponding to the free nuclei of the cancerous portions of the stomach. Three of these nuclear bodies were inclosed in one cell; while a few other cells had one or two. Indeed, it seems not to admit of doubt, that cancer was commencing to appear in the thrush-like formations.

The case just detailed presents, both pathologically and clinically, a number of striking and singular features. The precise seat of the cancerous growth in the stomach; the unoccluded orifices; the complete absorption of mucous membrane, excepting over a small surface of the organ; its contracted size; the firm adhesions to surrounding structures; the limitation of the malignant disease in the intestines to large segments; the thrush-like bodies in the digestive tube; the extensive one-sided pleuritic effusion; and the luxuriant cell-growth in the cancerous stomach, so unlike the usual microscopical features of gastric cancer—are points of decided pathological interest.

But still more interesting, certainly more anomalous, are the clinical bearings of the case. When we reflect that the malady had so obscure an origin, and that throughout its course it continued so latent that not a sign ordinarily belonging to cancer of the stomach was encountered: when, in other words, we look for the symptoms of disordered gastric function and failing health, so generally preceding the full development of malignant disease of the stomach; or inquire into the existence of

fetid breath, acid eructations, vomiting after meals, ejection of glairy-mucus or coffee-ground material, containing a varying amount of blood; or seek for the evidence of pain, constant and commonly aggravated by food, or of a tumour at the upper part of the abdomen perceptible to the touch; when, then, we contrast these phenomena with those actually present, or, to speak more accurately, note their almost entire absence,—we perceive how strange an illustration of a fatal malady was before us, and have one more instance added, showing how seriously a vital part of the economy may be diseased, without ever betraying its disease. The post-mortem results tend to explain the singular character of the symptoms; for in the diminished orifices, in the small size of the stomach, with its smooth exterior, its firm adhesions, its distance from the abdominal surface, in a part of the gastric mucous membrane remaining intact, nay, apparently being hypertrophied, in the unaffected duodenum, in the coexistence of cancer at other parts of the intestine, we find the main reasons for the kind of digestive disturbances which the case presented. And this record proves how very much more the manifestations of cancer of the stomach are the consequence of the exact seat of the cancer, and of the extent and nature of the destruction of the mucous membrane, than of the mere existence of the malignant disease.

But the case I have detailed did not only not resemble the affection the autopsy proved it to be, but it simulated in the closest manner a disease of a different viscus. This case of gastric cancer had all the traits of cirrhosis of the liver. It occurred in a spirit drinker; there was the dropsy, with the sense of fulness in the abdomen, with the small extent of percussion dulness in the hepatic region, with rather frequent stools, and these towards the last, pale, with the earth-coloured hue of countenance, with the gastric symptoms not more marked than they usually are in cirrhosis, and even with the presence of bile-pigment in the urine. True, the emaciation was taking place more rapidly than usual in cirrhosis, and the debility was greater; but the presence of so much fluid in the pleura and pericardium, and the state of the bowels, more irregular than ordinarily in cirrhosis, might have been urged to account for this. The only symptoms not those of cirrhosis were, that no granulations could be felt through the abdominal walls, that the spleen was not enlarged, and that the abdominal veins were not greatly distended. But to any one who has examined cases of cirrhosis, it is needless to say that to the first sign no importance can be attached; and that neither the second nor the third is constant.

In conclusion, there is one more feature of this case to which I shall call attention; and it has a significance far beyond this individual case. I have stated the temperature of the body to have been below 100° F., notwithstanding the progressive and rather rapid wasting. It is known that in tubercular disease the thermometer indicates a heat much higher—a fever temperature. Shall we find it the rule that cancerous affections show a comparatively low temperature? If so, many a doubtful differential diagnosis between cancer and tubercle of internal organs will cease to be doubtful. I have thus far four observations bearing on this point. In a case of cancer of the liver, under my charge at the Pennsylvania Hospital, and which terminated fatally, the evening heat was never but a fraction above 99°; in a case of cancer of the mesenteric glands, of which the temperature was taken carefully by one of our members, Dr. Edward Smith, it did not exceed 98°; in another case of internal cancer it did not reach 100° Fahr.

REVIEWS.

ART. XIII.—*Anæsthesia.*

1. *Chloroform: its Action and Administration. A Handbook.* By ARTHUR ERNEST SANSOM, M. B. Lond. London, 1865. pp. 192.
2. *On the Safe Abolition of Pain in Labour and Surgical Operations by Anæsthesia with Mixed Vapours.* By ROBERT ELLIS, Surgeon-Accoucheur. London, 1866. pp. 80.
3. *On Stimulants and Narcotics: with Special Researches on the Action of Alcohol, Ether, and Chloroform on the Vital Organism.* By FRANCIS E. ANSTIE, M. D., M. R. C. P., Assistant Physician to Westminster Hospital, Lecturer on Materia Medica and Therapeutics, etc. London, 1864. pp. 488.
4. *A System of Surgery.* Edited by T. HOLMES, M. A. Cantab. Vol. III., Art. "Anæsthetics," by JOSEPH LISTER, Esq., Professor of Surgery in the University of Glasgow. London, 1862.
5. *Traité d'Anesthésie Chirurgicale.* Par MAURICE PERRIN, Professeur agrégé à l'Ecole impériale de Médecine et de Pharmacie militaires, Lauréat de l'Institut, Chevalier de la Légion d'Honneur, etc. etc. etc., et LUDGER LALLEMAND, Professeur agrégé à l'Ecole impériale de Médecine et de Pharmacie militaires, Lauréat de l'Institut, Chevalier de la Légion d'Honneur, etc. etc. etc. Paris, 1863. Svo. pp. 668.
- A Treatise on Surgical Anæsthesia.* By MAURICE PERRIN and LUDGER LALLEMAND.
6. *Nouveau Dictionnaire de Médecine et de Chirurgie pratiques.* Tome deuxième. Art. "Anesthésiques généraux," par J. GIRALDES. Paris, 1865.
- New Dictionary of Practical Medicine and Surgery.* Art. "General Anæsthetics," by J. GIRALDES.
7. *Das Chloroform. Eine Zusammenstellung der bisher über dasselbe gemachten wichtigsten Erfahrungen und Beobachtungen, vorzüglich in physiologischer und medizinischer Beziehung.* Von Dr. FRIEDRICH SABARTH. Würzburg, 1866. Svo. pp. 276.
- Chloroform. A Collection of the most important Experience and Observations made up to the Present Time.* By Dr. FRIEDRICH SABARTH.

TWENTY years have elapsed since the discovery of anæsthesia brought into the world of reality what had before existed only in the fancy of the poet—a "borrowed likeness of shrunk death," producible at will, and of temporary duration. How unexpected was the achievement may be known from the fact that, only a few years before it was made, the leading surgeon of the world spoke of it as a chimera the pursuit of which was abandoned.¹ Yet, in fact, like many other discoveries in science and in art, it was the

¹ "Eviter la douleur dans les opérations est une chimère qu'il n'est pas permis de poursuivre aujourd'hui."—VELPEAU, 1835: from KIDD'S *Manual of Anæsthetics*, London, 1859.

result of long-continued and patient efforts made by many persons, and not accidental, but the termination of a pursuit carried on for years, with the definite end in view which was afterwards attained. The discovery found, too, a profession, if not a world, ready to receive it; its spread was as rapid as the transmission of news; and it may truthfully be said that the patient, whose agonies it annihilated, did not give it a heartier welcome or receive it with a more profound thankfulness than did the surgeon, who saw his feelings of humanity spared, while his operations were aided and the field of his usefulness extended.

The twenty years since the discovery have not passed without progress. The first success was not final; another and more powerful agent was soon discovered, and has almost entirely supplanted the one first used; several others have been introduced, experimented with, or used for a time, and abandoned. More powerful than all else to stimulate inquiry has been the shadow which soon came to darken the lustre of a discovery which, it would seem, might otherwise have been too perfect for our conditions here. Death was found sometimes to occur during the process of anaesthesia—sudden and unexpected death. The patient who sought relief from temporary pain found the termination of existence, and the surgeon was horrified at seeing his attempt to alleviate end in destruction. This sad fact has been the cause of more experiment and investigation than all else connected with the subject, and although certainty may not yet have been attained—although opinions have differed widely, and still differ, as to the circumstances which cause or favour this sad occurrence—the results have been a better acquaintance with the agents employed, clearer views of the sources of danger, and more certain rules for safety in their administration.

The work of Snow, which appeared in 1858, seemed to mark a period in the literature of anaesthesia. His views were so ably presented and supported by so much clinical experience, and his work was so complete a treatise upon the subject, that the profession generally accepted him as authority, and for some years his work and doctrines were sole occupiers of the field. But the brief space of time since then marks a wide interval of progress and research: our knowledge has been much increased; opinions have changed; and within a few years many works have issued from the press to give expression to them. The titles of some of these we place at the head of this article, and will briefly indicate their aim, scope, and general character, while we will try to gather from their pages the latest information and give the most reliable decisions upon some of the more important questions connected with anaesthesia and anaesthetics.

The work of Dr. Sansom may be characterized as most excellent. Written not alone from a theoretical point of view, but showing very considerable experimental study and an intimate clinical acquaintance with the administration of these remedies—passing concisely over the whole ground, giving the latest information upon every point—it is just the work for the student and practitioner. The author may rest assured that although in his preface he objects to the "hackneyed expression of 'endeavouring to supply a want,'" this is just what he has done—supplied, and well supplied, a want, for no such book existed before in our language. That he has "expended much labour in its compilation" is evident throughout, and we are certain that he has succeeded in his endeavours "to combine the characteristics of truth and brevity."

The work of MM. Perrin and Lallemand is a complete and exhaustive treatise upon the subject. With less of personal clinical experience, per-

haps, than might have been wished, the work contains chapters upon every subject connected with anæsthesia, from a thorough history of the discovery, with a critical examination of the merits of rival claimants for the honour, to a full consideration of what has only so recently attained practical realization—local anæsthesia. The chapters upon the physiological action of ether and chloroform are especially full; there is a complete list and full report of all the sudden deaths during administration of either agent which had been reported up to the time of publication; every theory advanced upon the nature or cause of this sad accident is given and thoroughly examined; finally, the application of the remedies to all the various operations of surgery and to obstetrics is fully considered.

It would seem scarcely possible that in these days of international communication such a work as this, upon such a subject, could escape observation and comment during several years. Yet such is the fact. We do not remember to have seen even a notice of this work in any medical journal, either foreign or domestic. Nor is this all; in all the works upon chloroform we have thus far perused we have not found an allusion to, nor an extract from, the book. What makes this more passing strange is the fact that these authors, with an associate, Duroy, have published a work¹ devoted to an exhaustive examination of the physiological action of these and similar remedies, and the doctrines advanced in which have given rise to no small amount of controversy among writers upon physiology and anæsthetics, and it is therefore referred to and quoted from very frequently in every work upon these subjects! So singular a fact we cannot fail to mention, while to explain it is impossible.

The present work bears upon its title-page the names of Perrin and Lallemand. A fly-leaf follows, and informs the reader that during the preparation of the volume M. Lallemand was called away to the post of "médecin en chef" of the French expedition to Mexico; that but a short time elapsed before "a glorious death came to change the sorrows of absence into eternal regrets." The publication would then have been abandoned, "had not the presentation of common researches and of ideas which had been cultivated together" appeared to his colleague "as a sacred debt which was owed to his memory, as a pious homage to be rendered to his friendship."

Dr. Sabarth's work follows very closely the design expressed in the title-page; it is a collection of the writings of others, rather than an original work. As affording a ready reference to the views of those who have written upon the subject, and especially as gathered from medical journals often inaccessible, it is valuable; but it lacks the impress of individual opinion, and a running commentary upon opinions advanced, often conflicting, cannot possibly assume the character of a scientific treatise. It passes very completely over the whole subject, and shows evidence of great industry in the collection of material from widely different sources.

The little volume of Dr. Ellis has been written with two objects in view: the demonstration of the practical utility of mixed vapours for anæsthetic purposes, and the introduction to the profession of a special inhaler, designed by himself, for their administration. It is an admirable little work, from the scientific spirit which animates it, and the judicious and moderate tone of expression which pervades it. He has worked long and faithfully

¹ Du Rôle de l'Alcool et des Anæsthétiques dans l'Organisme. Recherches expérimentales. Par Ludger Lallemand, Maurice Perrin, et J. L. P. Duroy. Paris, 1860.

at the subject by actual experiment, especially to learn the different rate of evaporation of alcohol, ether, and chloroform when combined, and his inhaler is a very ingenious piece of mechanism. The instrument and his mode of anæsthesia he claims to be particularly adapted for natural labour, for which they were designed. Upon one point the author deserves the greatest praise: having a special plan and instrument to present, he has not sought to build up a reputation for them by pulling down that of others. Regretting the accidents which sometimes follow the use of chloroform, he acknowledges they are very few indeed; and firmly believing in the superior safety of the mixed vapours, he does not exaggerate the danger of the pure article, or try to bring it into disrepute. In this respect he escapes a grave mistake made by Dr. Arnott in his advocacy of local anæsthesia by cold.

Dr. Anstie's work, so far as his doctrines in regard to stimulants are concerned, was fully reviewed in a late number of this journal. Only about one hundred pages of the volume are taken up with ether and chloroform, and this chiefly in regard to their physiological action. He is an original worker and independent thinker; his opinions and conclusions are valuable, and cannot be neglected in any view of the present condition of the subject.

Of the articles in the *System of Surgery* and the *Dictionnaire* we need only say they are worthy of a place in what may be called these national representative works. In both the subject of anæsthesia is briefly but most ably considered, and with direct reference to the demands of every-day practice.

We shall occupy but brief space with the history of the discovery of anæsthesia and the agents by which it is produced. One or two points demand brief mention. Thus, the French claim for Flourens priority of discovery of the anæsthetic properties of chloroform upon animals, an honour which is universally accorded to Simpson by English writers, although Sansom speaks of "certain observations" on this point communicated by the celebrated physiologist to the Academy of Sciences of Paris, in March, 1847.¹ At any rate, Flourens' observations bore no practical fruit, and are but another of those instances which excite our wonder at the near approach made to great results without attaining them. To render him justice for his discovery, however, is not to detract from the honour due to Simpson, whose personal daring in experimentation with the vapour, and his merits in verifying the efficacy and safety of its use, are beyond all praise. Rich and lasting as time, too, will be his reward. Often has it been impressed upon us as we have heard in some lonely cabin in the forests of a distant western State whose inmates never heard his name, a hearty "God bless the man who invented chloroform" coming from a heart overflowing with thankfulness for suffering abolished.

Upon one point, and one only, are we obliged to find fault with Dr. Sansom, and it is in connection with the history of the discovery. It is the entire omission of any mention of the first surgical operations in this country under ether.

"A man named Frost had a tooth extracted under the influence of sulphuric ether, absolutely without his knowledge of the operation, on the 13th of September, 1846.

¹ The reference in Perrin's work is to *Comptes Rendus de l'Académie des Sciences*, 1847, tom. xxiv. p. 342.

"The boon was too great not to be recognized. The news was brought to England, and ether was immediately employed for surgical operations by Mr. Liston and Mr. Fergusson."

This is all! Not a word of the operations at the Massachusetts General Hospital by Warren and Hayward! Surely this was not ignorance on the part of the author, but could only have arisen from carelessness. Certainly, for the honour of our country, we could not let it pass unnoticed.

The decision of foreign writers as to the controversy between Jackson and Morton for the honour of the discovery cannot but be of sufficient interest to deserve a place here. Giraldes briefly alludes to the long controversy before Congress and the Medical Society of Boston, into the examination of which he cannot enter, and says "the honour was accorded to Dr. Morton." The following is Perrin's decision, which seems to be assented to by Sanson:—

"Jackson first placed beyond doubt this capital fact, that general insensibility is one of the constant effects of ether upon the organism; he recognized besides that this insensibility could be obtained in a very short time, that it disappeared rapidly, and that it was not accompanied by the dangers which had been attributed to it. But these fundamental discoveries, rather obscurely seen than demonstrated by experience, needed fructification by an agent of execution docile and enterprising, and venturesome in proportion to the little he knew of the question.

"To Jackson belongs the credit of the idea; to Morton the realization of the idea: without the former etherization would not have existed; without the latter its advent would have been retarded many years. Both, by different claims, merit much from the human race for endowing surgery with a heroic means of abolishing physical pain. But if posterity erects statues to Jackson, she will hesitate perhaps to recognize as one of her benefactors a vulgar merchant of letheon." (p. 61.)

"A vulgar merchant of letheon!" the whole course of this individual since M. Perrin's work was published, but confirms the justice of the sentence. What was true then, is true now, and "pity 'tis 'tis true."

"Morton, from the first day, had seen in the assured power of abolishing pain only a good business to follow; thus, his first care was to monopolize, for his own profit, the benefits of etherization." (p. 57.)

For the honour of our country we deeply regret the facts in regard to this discovery, but can still congratulate ourselves that our profession is not implicated in the mercenary traffic which was attempted.

In tracing the early part of the discovery of anæsthesia M. Perrin seems to have followed Figuier (*Découvertes Scientifiques: l'Etherization*, t. iii.), for he quotes him frequently. In the later part he extracts freely from Jackson's "Defence," which is, of course, the testimony of an interested party. Certainly we know of very well informed medical men of this country who doubt whether M. Perrin could substantiate what he says as to Jackson's share in this discovery, especially in regard to his having placed beyond doubt that anæsthesia by ether was free from danger.

But there is another man belonging to this country, too, whose share in the discovery of anæsthesia has never been recognized as fully as it undoubtedly deserves to be. We allude to Horace Wells, of Hartford. He, either independently, or acting upon the long-forgotten suggestion of Sir Humphrey Davy, that nitrous oxide might be used to abolish the pain of surgical operations, pursued the study of anæsthesia by this gas with ardor and perseverance, and there is little room for doubt that he first established

the fact of anæsthesia, and glad we are to see that M. Perrin gives him full credit for it.

"The honour of the first public and authentic trial of surgical anæsthesia, by the aid of means newly discovered, belongs entirely to an obscure dentist of Hartford, a small town of the county of Connecticut."¹ (p. 47.)

This successful trial occurred several years before Jackson proposed, or Morton used ether; both these men had opportunity of communicating with Wells, and they knew the direction of his labours, and had witnessed some of the results, and there is no doubt that much for which they have obtained credit was derived from him—that the modern source and origin of anæsthesia was the brain of Horace Wells.

Yet his memory is neglected, and his name almost forgotten. Poor Wells! in all the annals of science we know no history more sad than his. Seeing clearly the good to be attained, yet failing to realize it, disappointed, chagrined, driven from the amphitheatre by the derision of a pack of thoughtless students, his heart broke under the trials, and with his own hand he terminated a life which had been spent in endeavouring to confer upon the race the greatest boon to suffering humanity. He died with the discovery almost within his grasp. He was a Columbus, whose bark went down within sight of the new land.

But, into this question as to the real discoverer of anæsthesia we cannot go. An impartial history of the subject has not yet been written, and probably will not be until all the actors have passed from the stage; then the relative claims of Wells, Jackson, and Morton may be impartially examined, and the merit of each impartially determined.

Authors are not agreed as to the mode of action of ether and chloroform. Leaving out of view the more mechanical theories—such, for instance, as that of Faure, which based anæsthesia upon a local change in the respiratory tissues—and which have been conclusively shown to be untenable, there remain two leading doctrines as to the *modus operandi* of these agents. One of them is that anæsthesia is produced by an interference with the interchange of oxygen and carbonic acid in the blood, and is therefore asphyxia; the other, that the agents circulate in the blood, and have an especial elective affinity for, and exert a direct action upon, the nerve tissue; that, acting as a direct poison, they abolish consciousness and the sensor-motor power. The latter doctrine is maintained by Perrin, and the experimental evidence which seems to substantiate it is more fully given in the physiological work on the *role* these agents play in the economy, which we have already mentioned. Of the former theory Dr. Sanson is the especial advocate. It will be seen that it is entirely *physico-chemical*; to those who maintain it *vital* actions are nothing.

"Anæsthetics are agents which, when absorbed into the circulation, exert an influence upon the blood. They are shown to have the power of altering its *physical character* and its *physical properties*. * * * Narcosis ensues; and is due, not to the influence of a circulating poison, but to the influence of an altered blood." (Sanson, p. 55.)

"Whatever produces, to a certain extent, insufficient aeration of the blood, produces narcosis; and whatever produces narcosis, produces, by some means or other, imperfect aeration of the blood." (p. 62.)

Of this doctrine we have to say, first of all, that as it is physico-chemical

¹ We translate as nearly literally as possible.

in nature, so it is based too exclusively upon physico-chemical experiments. We refuse to accept, as having more than a remote bearing upon the decision of the question, such evidence as that presented on page 43; because Gosselin "exposed the brain of a dog and poured chloroform thereupon," and because he "divided the organ and applied chloroform," and "no diminution of sensibility followed," we do not believe it therefore follows that anæsthesia is not produced by direct action of the remedy as it circulates through the nervous centres after inhalation. Neither do we accept as proof the fact that when chloroform is added to animal or human blood, it changes the shape of the corpuscles, and destroys them. Referring to Dr. Harley's experiments,¹ upon which the author lays great stress, we find them of the same nature; chloroform added to blood out of the body, interferes with the taking up of oxygen, and promotes the absorption of carbonic acid. To add a powerful chemical body to drawn blood, and attempt to deduce conclusions, from its coagulating or chemical action, as to its physiological action when introduced into the vital current by inhalation, is, it seems to us, to violate all sound rules of experiment and deduction; it is confounding the physico-chemical action of the agent with the subtle changes it occasions in the production or manifestation of nerve-force.

Again, we suggest that to term the anæsthetic process asphyxia is to necessitate a special kind of asphyxia to meet the case, for it certainly does not resemble the ordinary kind. In asphyxia, sensation is only lost under the influence of the circulation of black blood; in anæsthesia the blood does not become black, or nothing like of the deep hue of asphyxia, when sensation is abolished, unless the inhalation of the anæsthetic be *prolonged*, or in the cases of experiment on animals which are made to breathe the vapours from closed receptacles, thereby complicating the influence of the remedy with that of expired air; in asphyxia the loss of sensation is a secondary phenomenon, in anæsthesia it is primary; "numerous researches made by Renault, Longet, Blandin, and Guérin do not permit us to doubt that in anæsthesia complete loss of sensibility occurs before the arterial blood changes its colour."² The motive power, too, is differently affected in the two processes; anæsthetics abolish it, while on the contrary it persists in asphyxia to the end; "by mechanical irritation convulsions can be caused up to the moment of death."

Probably the weakness of M. Perrin's argument is in the fact that he bases it too exclusively upon the *quantity* of chloroform formed in the different tissues after death. He and his colleagues determined this to be as follows: "The blood being taken as the standard representing 1, the brain contained 3.92 parts; the liver, 2.08; the muscles, 0.16;" this view, therefore, is that "anæsthetics accumulate in the nervous centres by virtue of an elective affinity." Upon this point Dr. Sansom attacks them, and especially in regard to the large amount shown to be also in the liver. But it appears to us that the quantity thus found after death, is not necessary to the argument, and that the doctrine might be maintained had the amount never been determined. Nothing is better established in therapeutics than that certain medicines act invariably upon certain organs however introduced; that some pass out by one channel and some by another; we may call it "elective affinity," or what we will, the facts remain the same, and we should prefer to base the theory of the action of these remedies

¹ British and Foreign Medico-Chirurgical Review, Oct. 1856, p. 429.

² Perrin, p. 191.

rather upon reason, the results of analogy, of clinical observation, and physiological experiment, than upon physics, chemistry, or post-mortem examinations. Viewing the question by these lights, we feel compelled to adhere to the vital theory until we see something more conclusive than has yet met our eye.

"What experimental physiology permits us to establish is confirmed by clinical experience. During operations performed upon man in a state of complete anæsthesia, nothing calls to mind the idea of asphyxia: in the latter the mental faculties are simultaneously affected, the skin is marbled, the tissues turgid, the arterial blood of deep black hue; in the former, the mental faculties are only progressively invaded, the face is pale, cadaverous, and the blood escapes from the arteries in vermilion jets." (*Perrin*, p. 192.)

"The anæsthetic agents, principally chloroform and ether, act directly upon the nervous centres, and have for effect to veil, or temporarily destroy general sensibility and motor power. This action, which might have been *a priori* suspected, has been confined experimentally by the researches of physiologists, and in particular by those of Flourens." * * * "The anæsthesia produced by chloroform and ether determines, in the nervous centre, modifications differing in every point from those produced by carbonic acid or the oxide of carbon." (*Dictionnaire*.)

We shall not enter upon the question whether anæsthetics exert a favourable influence or not upon the result of operations. We supposed it was no longer an open one. The investigations made and statistics gathered in consequence of the rough challenge given to them by Dr. Arnott in 1856, seemed to have satisfactorily settled the point that no unfavourable effects resulted from their use either upon the healing of wounds, the occurrence of accidents or diseases, or upon the mortality after operations. Recently, however, a surgical writer in our own country has re-opened this question. Dr. Hamilton, in his *Treatise on Military Surgery*, not only expresses his doubts upon this point, but is decidedly of opinion that they "produce certain effects upon the system which tend to prevent union by the first intention, and consequently they must be regarded as, indirectly, causes of suppuration, pyæmia, secondary hemorrhage, erysipelas, and hospital gangrene." The charge is a most serious one, and emanating from an authority so high demands the most careful attention. As it can only be sustained or refuted by a further observation of facts and by carefully collected statistics, we refer the decision to the stern tribunal of clinical experience; merely remarking that, as it now stands, all authorities upon anæsthetics, as well as the leading surgical writers of the world, are against our countryman in this matter.

But the great point connected with anæsthetics is, as we have before intimated, the fact that alarming symptoms and even death sometimes occur during their administration. Were there "no danger in what show of death they make," not only would our present task be easy, but the world would possess at least one good unmixt with evil. As it is, the amount of danger, the sources of its origin, and the power of our art to prevent it, as well as the relative agency of the patient, the remedy, and the mode of administration in producing it, are among the most interesting and important questions connected with the subject. We believe that incorrect views in regard to them exert an injurious influence upon the use of these agents, and tend to limit and restrain their administration to the injury of suffering humanity, if not of the profession. Certainly these points deserve our serious consideration however rarely danger may appear and death occur, compared with the vast number of inhalations, and to this portion of the subject we shall devote considerable attention.

First, as to the number of deaths which have occurred from chloroform. Sabarth and Perrin both give "about two hundred," but as the former includes several cases of suicide, and both give deaths which followed several hours consecutively to the administration, and many which are so indefinite as to be unreliable, both lists should be subjected to close examination for scientific purposes. Indeed, Perrin does this and fixes the number of fatal cases due alone to chloroform at seventy-seven. We shall follow Dr. Sansom, the latest authority; he has collected fifty-six cases, which, with fifty given by Snow, makes one hundred and six, and agrees very closely with the report of the Committee on Chloroform to the Royal Medical and Surgical Society, which gives one hundred and nine.

But accuracy in this respect is not necessary; the only condition in which it would be essential would be that of having the total number of administrations of the remedy. Then we could learn what would be very interesting, if not instructive, to know: the relative number of deaths to administrations. This it is impossible to learn, and many efforts have been made to get an approximation by estimate, generally ending in the proportion of 1 to 20,000 to 30,000. Lately, Dr. Richardson has been writing the medical history of England, and has transcribed from the books of the various hospitals visited the number of inhalations of chloroform, and he found but one death to over 17,000 inhalations. Yet all these calculations differ much and assist us but little; in the language of M. Perrin, "they are as easy to produce as difficult to contest," the fruit of "a sterile erudition which dazzles but never enlightens." All we can say is, that some persons have enjoyed complete immunity from accident who have dealt with the agents daily for years, as is the case with Velpeau and Syme; and the instance of the French Army in the Crimea with 30,000 administrations and no death is remarkable.

The period of administration at which death occurred is of the deepest interest, both theoretically and practically. Thus of the 109 deaths a large proportion took place early in the process, before the commencement of the operation for which it was given; "a strange and certainly a noteworthy fact." The table shows within a fraction of fifty per cent.:—

Before full effect of chloroform	.	.	.	50
During	"	"	"	52
Not stated	.	.	.	7

109 (*Sansom*, p. 68.)

In regard to sex, all authorities agree that men are more subject to death than women, notwithstanding the number of administrations in obstetrics. Snow gives the proportion as 3 to 2; Scoutetten, 2 to 1; Kidd, 4 to 1; and Sansom, and the report of the chloroform committee, which we should consider the most reliable, respectively 2.8 to 1, and 72 males to 37 females.

Age has been shown to have a powerful influence upon the mortality under chloroform. Thus, while it has been given at all ages, from a few days, or even hours, up to the extreme limit of old age, the largest proportion of deaths have occurred in middle age, at the period of most robust health and greatest vigor, and children have shown so great an immunity from accident as to cause the anæsthetic process in them to be considered entirely free from danger. Time, alas! has proved this to be a fallacy; even since the publication of the latest work upon this subject this new and important, but sad truth, that children are also liable to accident from chloroform has been learned. While Sansom gives in his table no case of

death under five years, a case at two years, which occurred at Liverpool, has been reported,¹ and another at four years is alluded to in a discussion at the Société Impériale de Chirurgie,² although we have seen no report of the case.

The condition of the patient exercises an influence widely different from what would be expected, although authorities do not seem to agree upon the matter :—

“It certainly appears that the healthy and strong stand a worse chance with chloroform than those who have been debilitated by disease. * * This is so supported both by figures and by individual observation, that we can scarcely refuse to receive it, as it has been entitled—the ‘*law of tolerance*.’” (*Sansom*, p. 67.)

This we believe is the general and correct doctrine, yet M. Giraldes differs from it, and agrees more nearly with Hamilton :—

“There is meanwhile one pathological condition which demands extreme prudence in the employment of anaesthetics. I allude to those individuals exhausted by profuse hemorrhage, or in a state of pronounced chloro-anæmia, and in whom the nervous system has become very excitable and more susceptible to be impressed by the action of external agents which, like chloroform, affect directly the nervous centres. These conditions, in fact, appear to me to be in some cases a serious objection to the use of these agents, and when we are obliged to make use of them, extreme prudence should be exercised, and the diverse functional modifications which they may produce should be watched with the greatest attention.” (*Dictionnaire*, p. 243.)

The kind of operation for which the chloroform has been administered, is, again, the reverse of what would have been anticipated. By far the largest proportion of deaths has occurred in cases of the most trivial operations; a fact which has created universal surprise, and excited deep interest, from the apparent impossibility of furnishing any adequate explanation. We abridge from Sansom (p. 69), the following table :—

Operations of minor import—such as extraction of teeth, etc.	62
Operations of moderate severity—removal of breast, dead bone, etc.	26
Capital operations	7
Reduction of dislocations	6
Delirium tremens and mania	4
Natural labour	2

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It is to be very much regretted that Dr. Sansom has not given us the particulars or the authorities of the last class—the two cases of death during natural labour. Nothing, certainly, would have been of greater interest, for it has been maintained and repeatedly stated that no death ever occurred from the administration of chloroform during natural labour. If these are cases such as have been brought forward by those opposed to the use of chloroform in obstetrics when the patient administered it to herself, no one but the nurse being present, we should like to know it. Equally should we like to learn if there have really been two cases of death under these circumstances, and the particulars concerning them. As it is, we have looked in vain for them; Dr. Sansom's book contains only the line we have quoted; the other works not a word. We thought we should find them in the list of deaths of the report of the chloroform committee,

¹ Medical News and Library, January, 1866.

² Gazette des Hôpitaux, Juin 23, 1866.

but they are not there, and Dr. Sansom quotes from this report, without remark, in a subsequent chapter, that "there is no well-authenticated instance of sudden death recorded, either in this country or abroad, as occurring from the administration of anæsthetics during natural labour, when such administrations have been conducted by a qualified medical man."

These are some of the most notable facts connected with chloroform accidents which we have thought necessary to briefly mention before proceeding to a statement and examination of the doctrines of our authors in regard to the manner of dying and the probable determining cause of death. That equally able men are not agreed upon this point need excite no surprise, and will not with any one possessing but slight acquaintance with the difficulties which embarrass a decision. In regard to the symptoms when death takes place, the reports of fatal cases are written after the fact, and are the remembrance of events which occurred with great rapidity and under an agitation of feeling on the part of the observers easier imagined than described, and written too with a very natural regard for those most deeply concerned. Experiment upon animals, so valuable a means of determining such questions, fails here because it seems alone to teach us that we cannot produce death in them with the suddenness and rapidity of chloroform death in man. When it is said, finally, that examination of the body after death throws no certain light upon the mode of dying,¹ the great difficulty of the subject will be seen at once. It is, in fact, one of the most abstruse problems ever presented to the human mind for solution.

The first statement to be made in regard to these deaths, is that undoubtedly a considerable number, and especially of those which occurred at the very commencement of the inhalation, were entirely independent of the chloroform. They were purely the result of emotion; a snapping of the vital cords strained to their utmost tension by the arrival of the long-dreaded moment for the operation. Such sudden deaths during, or even just before an operation, have always been known, and many such have been reported. The case of Desault's is well known; he traced with his finger-nail the line of incision in the perineum of a patient bound up for lithotomy, and the man shrieked and died. The case of Simpson's is more note-worthy because chloroform was to have been administered for the first time; the doctor was delayed, and the operation proceeded without it, the patient dying suddenly after the first incision. Had it been given it would doubtless have been not only the first but the last administration! All our authors agree that many of the sudden and early deaths were really caused by psychical influence and not by the anæsthetic. Thus, Dr. Sansom says:—

"It is reasonable to suppose that fright or apprehension may have had some share in causing the mortality among those who have succumbed before the symptoms of anæsthesia have been induced—that chloroform may have been but one (and that perhaps the least) among the influences." (p. 66.)

We believe this statement far too moderate, and think that few are aware how frequently such deaths occur. The number collected or mentioned in

¹ "In the present condition of the subject it must, alas, be said, that the diagnosis, the matter of fact of death by chloroform, is to be established more by the circumstances preceding the decease, than by the results of the *post-mortem* examination." (*Sabarth*, quoted from *Casper*.)

these works has certainly surprised us. M. Perrin, in his introduction, gives the following :—

“A robust man died suddenly of pain during the efforts made to reduce a suspected luxation of the knee.

“A soldier, aged 25, affected with phymosis which concealed fungous growths, submitted very reluctantly to an operation. No sooner did he see the surgeon's hand armed with a bistoury than he fell into a syncope and instantly died.

“A woman, 45 years old, of bilious temperament and very irritable, had a cancer of the breast. She only consented to an operation with the greatest difficulty. During the operation she died in the presence of the assistants, even under the hands of the surgeon, just as he had made the two incisions and began to dissect out the tumour.

“An old man, who was suspected of having stone in the bladder, was to be sounded: he had an unconquerable fear of this investigation. Scarcely had M. Civiale approached the meatus with the sound, than, seized with terror, he died in the presence, and in spite of the earnest cares of such celebrated practitioners as Civiale and Honoré.

“Similar accidents have happened twice at the Hôtel Dieu, in the practice of Roux.

“This list could be increased, if necessary, by the well-known cases of Garangot, Chopart, Desault, Cazenave, and several other authors.”

Dr. Sansom alludes to some of these and to another which occurred to Mr. Stanley.

Dr. Sabarth delivered a woman with the forceps—“an easy forceps delivery,” and left her doing well: within fifteen minutes he was called back to her in great haste, and found she had suddenly died. He truly says that had chloroform been administered, however slightly, it would have received the blame of the death. He also gives the following case, which happened to Cazenave, of Bordeaux, and is alluded to in Perrin's list.

“A man, 40 years of age, was thrown from his horse and received a broken leg. Amputation appeared necessary. The patient was so depressed by the idea of losing his limb, that although the intention had been to chloroform him, this was abandoned, and it was agreed only to make a show of giving it. A cloth, without any chloroform, was held some distance before his face. Scarcely had he made four inspirations, than suddenly respiration stopped, and the heart ceased to beat. All efforts were vain: he was dead.”

Lister gives a similar case which occurred in the practice of Dr. Mackenzie, of Edinburgh.

“Being called to see a gentleman who had fractured his radius, he had some thought of employing chloroform in examining the arm, but, changing his mind, made the necessary manipulations without it. He then proceeded to leave the house, but had not got down the steps leading from the door when he was called back with the announcement that his patient had suddenly expired.”

Giraldes, after examining the danger of chloroform administration, comes to this conclusion, which is important enough to be placed in italics :—

“The accidents which have been observed do not much surpass in number the cases of sudden death which have occurred without apparent cause during or soon after operations.” (*Dictionnaire*, p. 245.)

Whether this statement be true or not, it may well be urged in favour of chloroform that by its use in a part of these cases, death would in all human probability have been prevented, by banishing emotion and destroying pain, and that if we are obliged to grant that it sometimes kills, it sometimes also directly saves.

Farther, from the list of deaths charged to the account of chloroform we would deduct all those where a very severe operation was performed, or one accompanied by much hemorrhage. To attribute the death which follows such an operation as removal of the scapula, or, as we have heard, of ovariectomy of forty minutes' duration, to the chloroform employed, is manifestly unjust. In such cases, chloroform should bear a portion, but only a portion, of the responsibility. It comes, as Giraldes well says, "to add a new factor to the causes of death," but to count, or to weigh such cases in an estimate of the danger of anæsthetics is unfair.

Were we writing solely for the *future* of chloroform, there is another class which we should also eliminate from this list, because experience has taught us the danger of its administration under such circumstances, and it can therefore be avoided. We allude to patients suffering from delirium tremens. No less than nine deaths have taken place in such subjects. Indeed, that the habitual excessive use of alcoholic drinks excites the worst possible influence upon the patient in regard to chloroform inhalation, is the universal testimony of authorities. Experience upon this point has accumulated since Nelaton first called attention to the fact, and it may now be said to be the universal conclusion that anæsthetics should be administered to "hard drinkers" only under circumstances of absolute necessity.

Proceeding with our investigation as to the cause of death and the manner of dying, two subjects intimately connected, and commencing with the best established doctrines, we find that death under chloroform does not take place from deep narcotism, or too prolonged administration; upon this point all our authorities agree, although some say "not from an *over-dose*," a very different expression, and one to which we do not assent.

"The history of surgical anæsthesia, of its accidents and its errors, equally teaches us that the misadventures due to chloroform are not the result of a methodical administration too long continued." (*Perrin*, p. 172.)

That chloroform can kill in this way no one doubts; but if a man commits suicide, or kills himself, as Toynebee has just done, by breathing its vapour *à l'outrance*, or a woman during labour inhales it with no competent person to watch its effects, and dies, these facts should not be held against the safety of the remedy when properly used. That chloroform does *not* generally kill in this way, we have absolute proof; first, the early stage of the process at which death took place in so many of the fatal cases, and, second, the known small quantity which was administered in some of them. Still, Dr. Sansom is of opinion that death was, in a few of the cases, caused by too deep narcotism, and thinks this must be looked upon as one of the causes of death.

The deaths under chloroform cannot be ascribed to disease of the heart. As soon as it became known that the heart was depressed in its action by the anæsthetic vapour it was naturally concluded that a diseased organ would feel the depressing influence more powerfully than a healthy one, and an explanation being a greatly needed want, this theory found a ready acceptance. But Snow taught that the assumption was false, and we have scarcely anything to add from these authors to what he wrote upon this point, except that the presentation of their testimony may add to the authority. All concur that disease of this organ is no contra-indication to the administration of chloroform, except M. Perrin, who believes it predisposes to syncope.

"Over and over again I have given chloroform to patients affected with incompetency of the valves of the heart, and I have found them very good

subjects indeed for its influence. * * * In persons affected with valvular disease—in those in whom cardiac mischief is the result of acute rheumatism, for example—there is no special danger in the administration of chloroform.” (*Sansom*, p. 76.)

We might repeat nearly the same in regard to fatty degeneration. M. Giraldes, the writer in the *Dictionnaire*, makes the statement that Snow considered this a substantial contra-indication. But this is not so; he says: “I have given chloroform in numerous cases without ill effects where the symptoms of this, as well as other affections of the heart, were present in a very marked degree.”¹ M. Giraldes says that experience has demonstrated that the deaths have been wrongly imputed to this pathological condition. And—

“Individuals, considered to be labouring under this organic modification, have been submitted to chloroform inhalation with impunity, and some of those who have succumbed during anaesthesia have not presented the lesion in question.”

That special care should be exercised in such cases seems reasonable and is generally inculcated. Dr. Sansom would abstain from it in fatty degeneration:—

“The general lesson inculcated would seem to be this: that in cases of marked fatty degeneration of the heart, chloroform should not be administered: that in cases wherein a debility of the heart is suspected, unusual care should be exercised to administer a free dilution, so that the heart should not be paralyzed by the sudden shock of an influence which it cannot withstand.” (p. 77.)

There are some, however, who go much further than this, and boldly claim that by abolishing pain and preventing its influence in producing irregularity of the heart's action chloroform directly favours the safety of the patient. This was Snow's doctrine, and the report he gives of the action of the heart in a patient whom he observed under lithotrity, both with and without the anaesthetic, is one of the strongest proofs of this position, as it is one of the most interesting observations relating to this part of the subject on record.

Mr. Lister is of this opinion:—

“It might, perhaps, have been expected *a priori* that chloroform, in the early or exciting stage of its operation, would act upon a diseased heart like mental emotion, and cause irregularity or cessation of its contractions; but this does not seem to be the case. Judging from my own experience, I should say that it tends rather to remove [prevent?] intermission or irregularity of the pulse; and on the whole, I believe that chloroform, by preventing shock and mental effort during the operation and anxiety before it, is in reality a great source of safety in heart disease.”

Notwithstanding this gentleman witnessed a death under chloroform and the patient's heart was found to be “extensively affected with fatty degeneration,” he nevertheless attributes the death to another cause, which will be considered presently—the shock of the incision: a cause which cannot exist with complete anaesthesia; and as to whether chloroform promoted the fatal result says:—

“My own impression is, that if it had been pushed to the usual degree, the fatal occurrence would have been averted.”

The doctrine that death results from a particularly idiosyncrasy of the patient has had several advocates of ability and high professional standing,

¹ On Chloroform and other Anaesthetics, London, 1858, p. 54.

and at one time it was quite popular. It was, however, long since found unreliable, and is, we believe, at present, entirely abandoned. As M. Perrin justly says, if the deaths resulted from such a cause their number should be more regularly proportionate to the number of administrations, which is far from being the case. He cites too, as going to show the fallacy of this view, that "in spite of a number of administrations relatively limited, the cases of sudden death in the hands of dentists figure in the proportion of at least 10 to the 100 in the necrological table." But there is stronger proof still, in the fact that in many of the cases of death the patients had previously inhaled chloroform; of the 50 fatal cases of Snow 13 had done so; in one case it had been given six times before. This destroys all foundation for the doctrine. Idiosyncrasy is a particular mode of being or of reacting to the stimulus of external agents peculiar to the individual, and so much a part of him, or of his life, that it is ever with him, does not change from day to day, and ceases only when he ceases to live.

This conclusion has been almost universally and very certainly arrived at by authorities on the subject: death under chloroform in the human subject does not always take place in the same manner, or as a consequence of the same pathological causes. And it is a decided advance to arrive at such a conclusion, for there has been a tendency to cling to some particular theory of death as the only and invariable one. Such theories have been founded on but partial views of the phenomena, have led to the use of but partial precautions for the prevention of accidents, and have decidedly interfered with further advances of our knowledge. The accepted doctrine now is that death takes place by syncope or paralysis of the heart, and by asphyxia, authorities being divided as to which is the more frequent and which deserves the greater consideration. The able advocacy of Snow gave great predominance to the doctrine of death by paralysis of the heart, and backed as it is by the unimpeachable evidence of experiment as to the depressing influence of chloroform upon the heart's action, it bids fair to maintain its supremacy. We shall see, however, that views differ as to whether this cardiac paralysis is primary or secondary. With Snow it was primary; blood charged with more than five per cent. of chloroform vapour acted directly on the organ, and his experiment of stopping the heart's action in anæsthetized animals, by blowing chloroform vapour on the exposed organ, is strongly confirmatory of this view. Yet there is strong proof and much reason for the belief that this, at least, is not the only way in which the heart is paralyzed, that the paralysis is often of reflex character, secondary to some peripheric excitation or the result of some profound effect upon the centres of the nervous system.

Let it not be imagined that this question as to the mode of death is one of theoretical interest merely; it has practical bearings of very great weight.

"During the period in which the doctrine of asphyxia was dominant, and during which we were preoccupied with improvement of the manner of anæsthetizing, the annual mean of sudden deaths was about seven for the space of seven years.

"Since the ideas of syncope have prevailed, and that we have learned to place great value upon the moral state, whether in regard to the appreciation of the indications or to the manner of conducting the anæsthesia, the annual mean has remained fixed at three. And meanwhile the manner of inhalation has not been changed; we employ chloroform oftener and with less hesitation. What is this but to say that we know better how to use it, or, more exactly, that we know better to whom to give it?" (*Perrin*, p. xiii.)

We will give Dr. Sansom's views as to the mode of death first; it will

be seen that he introduces a third class, one not mentioned by any other author.

"Death in the human subject may take place by three modes. I. By syncope. II. By asphyxia. III. By necremia.

"The death by syncope may be in one of two forms: (*a*) in consequence of the loss of the irritability of the muscle. * * * This is the common form of death, and is akin to the death from shock. * * * (*b*) tonic spasm. This is not usual, but has occurred; the heart having been found firmly contracted and containing no blood. Here would seem to be a sudden influence on the sympathetic—an irritation, not a palsy.¹

"The death by asphyxia may be peripheral or central: (*a*) from disorder of the lungs themselves, as in cases of disease wherein a rapid congestion may be superinduced; or (*b*), from suspension of the motor power. * * *

"Death by necremia occupies a position between these more decided forms. Death is due to a faulty condition of the circulating blood, which at one and the same time enfeebles the heart, impairs the activity of the nervous system, and prevents the due performance of the vital changes in the systemic capillaries." (pp. 98, 99.)

As to the relative frequency of these different forms, the author does not express himself definitely; he says sudden cessation of the heart's action is the most frequent of all indications of death. He copies the table of the chloroform committee, which gives 62 deaths by syncope out of the 109; 9 in which pulse and respiration ceased together; and only 2 in which respiration failed before the pulse.

Dr. Anstie's conclusions are arrived at after careful study of the subject and from the observation of one fatal case, and of twenty-one cases in which alarming symptoms occurred in his own practice. He believes death takes place in two ways depending on the rapidity of absorption of the vapour.

"When the impregnation of the blood takes place with *moderate* rapidity, the sympathetic nervous system is the *ultimum moriens*, and death *begins at the lungs*.

"When, on the contrary, the circulation becomes very rapidly charged with a large proportion of chloroform, the narcotic effect may fall with such force upon the sympathetic nerves as to extinguish their vitality at once."

* * * "From the fact that in the immense majority of reported fatal cases the first symptom of danger was confessedly the failure of the pulse and the blanching of the countenance, the conclusion appears strongly indicated, that paralysis of the heart is *the* source of danger in surgical chloroform narcosis." (pp. 382, 383.)

Dr. A. is a believer in the direct action of chloroform as it circulates in the blood as such, both in producing anaesthesia by its action on the nervous centres, and death by its influence upon the sympathetic nerves of the heart.

¹ The following quotations will show how far one of the highest authorities upon affections of the heart is willing to commit himself upon these points. The italics are our own.

"Now, it is infinitely probable, changes occurring in the ganglia themselves, either dynamic or structural, may be the immediate cause of suspended pulsation of the heart in some cases—but the clinical proof is yet wanting. Still, in certain cases of chloroform inhalation, where death occurs through the heart, *it seems reasonable to believe* the vapour, acting directly on the cardiac ganglia, plays a part in instantaneously arresting their activity." (*Walshe on Diseases of the Heart*, Am. ed., p. 134.)

"Does the heart ever become the subject of true spasm, either clonic or tonic? A positive answer, founded on clinical evidence, cannot, in all probability, be given to this question." (p. 135.)

Dr. Ellis recognizes three sources of danger from chloroform :—

“1st. From its influence over the heart; 2d. From its effects on the functions of the lungs; and, 3d. From its action as a narcotic poison in the production of coma. The two latter sources of danger may arise either from the vapour of ether, or possibly from that of alcohol, as well as from that of chloroform.” (p. 29.)

In M. Perrin we find a strong advocate of death by syncope. He has given a full statement of all the reported cases, and entered at very considerable length into a critical examination of the facts detailed, and of the theories which have been advanced to account for them. His conclusion is that “death is the result of dynamic perturbations, of which syncope is the habitual organic expression.” (p. 273.)

“The mechanism of death, judged by the order of abolition of functions, is always the same, and manifests itself as follows: Sudden arrest of the sounds of the heart; immediately afterwards, exhaustion of the forces, definite cessation of respiration, extinction of all vital manifestations.” (p. 352.)

But this syncope, according to him, is not the effect of the anæsthetic, although all anæsthetics predispose to syncope, but an accidental complication, independent of the agent, and having some other cause, “which by its nature is independent of, and should be separated from, the phenomena of anæsthesia.”

“Abstracting the exceptional cases in which it may be supposed that death was the result of an imprudent or excessive administration, the facts demonstrate that sudden death during the anæsthetic process is always the result of an accidental syncope.” (p. 405.)

“Viewed as a direct effect of the anæsthetic agent, sudden death during anæsthesia cannot be explained by what we know of the action of these agents; it presents none of the principal characteristics of this action; it rests an eternal enigma, surrendered to the convenient interpretations of occult influences far from satisfactory, and, above all, useless. Viewed as an accident, on the contrary, it becomes a regular effect, normal, the nature of which is revealed by the observation of similar accidents which happen without anæsthetics, and, what is more important, the immediate causes of which are deduced without effort, either from the conditions created by the state of anæsthesia, or from anterior conditions of the patient, or also from the manner in which anæsthesia has been practised.” (p. 357.)

But with M. Perrin syncope means far more than it does with us. We have seen that Dr. Sanson makes it synonymous with paralysis of the heart; M. Perrin makes it synonymous with “sideration:”

“In order to avoid all confusion, we will say that sudden death by sideration and sudden death by syncope, or, if you will, by *syncope foudroyante*, represent but one and the same form of accidents.” (p. 406.)

“Sideration” is a term which has become pretty familiar, from its use by French writers in connection with this subject. It is a death, sudden, instantaneous, without material cause; the result of some profound dynamic perturbation of the nervous system; and not, as our author states it in this connection, of the nervous centres merely, but of “the entire nervous system, as well the nerves of the periphery as their central point of emergence.”

It will be seen, then, that M. Perrin adheres to the *name* rather than the *thing*; his “syncope” includes many forms of death, having widely different pathological origin. For instance, he considers one class of deaths as by “syncope of psychical origin;” a class which includes all those which we term death from *emotional causes*, a class which more truly than

any other is in accordance with his views as to being of accidental origin and entirely independent of the anæsthetic as a cause. We have already shown how frequently death of this kind takes place. Another class he terms "syncope of organic origin," and subdivides it into those arising from the brain and from the lungs, and explains the fatal result by the influence which both exert over the central organ of the circulation. To the latter, if not to both of these, we shall presently give further attention.

There are two curious positions into which M. Perrin is betrayed by his reasoning, and, by the views he has adopted, deserving a moment's consideration. The first is the acceptance of a peculiar idiosyncrasy in regard to syncope, after having rejected such a thing in reference to chloroform, and the second, that a person peculiarly liable to syncope is not therefore a bad subject for chloroform! Both are exhibited in the following extract:—

"We have combated the idea of an idiosyncrasy special to chloroform, but are obliged to recognize the existence of a certain predisposition in regard to syncope. There are subjects who have faintings upon almost every occasion, and almost at will. This predisposition may be habitual, permanent: such, from experience, should inspire little fear. We have already said that women, in whom such a disposition appears especially developed, are not more exposed than men to the chloroformic syncope. It may be accidental, and develop itself under the influence of multiform causes, capable of modifying, at any given moment, the vital force of resistance, of creating such a nervous condition that the least emotion, the least shock, provokes a syncope. In this is the real danger." (p. 429.)

The practical effect of M. Perrin's doctrines are far too important to be passed over in silence. From the extracts we have given, and from the work at large they are, briefly stated, that sudden death is a danger inherent to anæsthesia, and by virtue of conditions belonging rather to the *subject* than to the agent or to its mode of administration, that this danger cannot be foreseen, and therefore cannot be guarded against:—

"The cause of danger, being accidental and inherent to the subject, remains permanent as the subject; there does not exist, and there never will exist, any means by which it can surely be avoided." (p. xiii.)

We do not believe it. Meanwhile we postpone further examination of this point to consider for a moment the practical effect of such doctrines upon the every-day practice of our profession. Is it not to restrain the use of this important class of remedies within very narrow bounds? Is it not, in fact, to limit their use to operations of great severity, and to cases of absolute necessity? Faithful to himself, this is what M. Perrin would do. He acknowledges the difficulty of laying down absolute rules; admits that one person suffers more from a slight, than another from a severe operation; but he banishes it entirely from minor surgery (which local anæsthesia will now most surely do), and also from all such operations as those for ingrown nails, extraction of teeth, etc. He banishes it also from all those operations known as "operations of complaisance," those for the relief of deformities, and from use in all those "researches designed to triumph over a supposed simulation or dissimulation, or to clear up a medico-legal question."

And this is the course all those must follow who believe that there is an inherent danger in chloroform which no sign foreshadows and no care can avoid. As the surgeon should never undertake an operation without candidly laying before his patient the risks he must run, so should the chloroformist say honestly, whenever he administers the anæsthetic, if this

doctrine be true, that possibly death will occur during the use of it, and the temporary abolition of consciousness prove an eternal oblivion. We will not dilate upon the influence such a communication would exert on the mind of the patient in favouring a fatal event during the inhalation, or upon the result of the operation for which it was inhaled; nor upon the denial thus made to suffering thousands of a boon which more than any other in the records of science deserves the name of heaven-given.

M. Giraldès, in the *Dictionnaire*, finds Snow's theory of death unsatisfactory, and asks what we shall substitute for it. This is his answer:—

“We must admit that all the hypotheses advanced for the solution of this difficult problem are open, in divers degrees, to some objections. That which appears to approach nearest to reality, and which at least is founded on rational physiological grounds, is without doubt the theory which regards the mortal accidents during anæsthesia as produced by an apnœa, occasioned by an accumulation of the anæsthetic fluid in the medulla oblongata.”

But this theory is open to the objection that it does not account at all for the *early* deaths and especially for those where very little of the agent was inhaled. It is based, of course, on the statement of Lallemand, Perrin, and Duroy, in regard to the amount of chloroform in the various tissues. We are ready to agree to the general statement of this author that it is “by an intervention in the functions of the nervous system that the sudden arrests of respiration, syncope, and sudden deaths are produced,” but cannot yield assent to his explanation that these effects are produced by an unusual quantity in the nervous centres. Sometimes this is undoubtedly true, but cannot be in regard to those which occurred at an early period of the inhalation.

We shall not attempt to follow Dr. Sabarth through an examination of the different theories he has collected from various writers, but content ourselves with a table showing the number of deaths by each form, compiled from a careful examination of all the cases he could find, reported with sufficient detail and accuracy for such a purpose; they were only 47 in number, and his conclusion as to the mode of death is from the symptoms which presented themselves and the results of the post-mortem examinations:—

Asphyxia, respiration ceasing first	36
Syncope, pulse ceasing first	11
	<hr/>
	47

Mr. Lister declares himself a believer in the doctrine of death from too long-continued administration of the vapour. As between danger from failure of the circulation and from cessation of respiration, he is strongly on the side of the latter. Unfortunately he has adopted decided views in favour of the administration of chloroform from a cloth. He seems bound to prove that Snow was wrong in “assuming that when chloroform is given from a folded cloth, it is apt to be in too-concentrated a form,” and that most of the deaths that have occurred should be attributed to paralysis of the heart from the vapour being inhaled without proper dilution. He therefore writes too much like a partisan upon this point; worse still, he experiments like a partisan. For instance, he saturates a cloth with chloroform, suspends it before his face, notes the rate of evaporation as shown by a scale-beam to which the cloth is attached, but *inhales through a tube, from a distance*, instead of inspiring the air and vapour immediately about the nose and mouth, and claims that the inspiring current “does not

materially affect the rate of evaporation," and that the conditions are similar to those of a patient inhaling the vapour for surgical purposes! We think common sense will negative any amount of such experimentation.

These are his conclusions:—

"The theory of syncope from too great strength of the anæsthetic vapour when the cloth is employed being erroneous, the greater number of the deaths remain unaccounted for; and, if we except a very few instances for which we seem to have nothing to fall back upon but an idiosyncrasy so rare, that it may be practically left out of consideration altogether, their explanation will, I believe, be found in an overdose of this potent narcotic from too long-continued administration." (p. 99.)

Throughout Mr. Lister's remarks upon this branch of the subject, we find the early deaths ignored and the stage of stertorous breathing is looked upon as the only one in which the patient is in peril. To this stage of anæsthesia, or rather to the respiratory process during it, he has paid particular attention; he goes at length into an examination of the mechanism of stertorous respiration, and is a warm advocate of the efficacy of forcible pulling forward of the tongue as a means of "averting danger only." One very important point he insists upon is that stertorous breathing may "become aggravated till it passes into complete obstruction to the entrance of air into the chest, though the respiratory movements of the thoracic walls still continue." All this portion of the article is extremely interesting and of the very highest practical value.

Mr. Lister does not hesitate to carry his doctrines into practice, and boldly follows the path along which his conclusions lead him:—

"The very prevalent opinion, that the pulse is the most important symptom in the administration of chloroform is certainly a most serious mistake. As a general rule, the safety of the patient will be most promoted by disregarding it altogether, so that the attention may be exclusively devoted to the breathing." * * * "Even when serious disease of the heart is known to exist, it must be remembered that there is much less risk of syncope than of obstruction to the respiration." * * * "Preliminary examination of the chest, often considered indispensable, is quite unnecessary, and more likely to induce the dreaded syncope, by alarming the patient, than to avert it." (p. 105.)

We have now pretty fully presented the prevalent doctrines as to the mode of death under chloroform. If we were restricted to the choice of a single authority upon this point among those we have cited, it would be Dr. Anstie; his views are rational, supported by facts, and, so far as they go, satisfactory. But that there may be other modes of death, appears certain. There has always seemed to be a tendency to restrict the fatal influence of anæsthetics too exclusively to the *chest* organs; this is the great objection to Snow's theory, and to some others. Since the central nervous system has been acknowledged to be liable to a fatal influence from chloroform, whether from too prolonged or too rapid administration, there appears a like tendency to restrict the fatal influence to that part alone, ignoring other parts of this important system, equally important, and, in our opinion, equally influential in producing death.

There is one mode, in which we believe death may be occasioned, which we are surprised to see has not received any attention from writers upon this subject. We allude to death by shock, the fatal impression being a sudden influence upon the branches of the par vagum in the lungs, pro-

¹ See note to his article on pages 97 and 98.

duced by the inhalation of undiluted vapour of chloroform, this impression being transmitted by reflex action upon the heart. The pathological condition is Sansom's syncope from "loss of the irritability of muscle;" the cause, which he does not give, is, as we have indicated—a profound and sudden impression upon the peripheral extremity of nerves distributed through the lungs. He says this form of death is "*akin* to death from shock;" we say it *is* death from shock. Why not call it so? Certainly it is preferable to the adoption of the French word "*sideration*," a term much better adapted to concealing our ignorance than expressing our ideas, and far inferior to an English word which conveys a distinct idea to every medical mind, however little we may know of the ultimate pathology of the condition itself.

But will reason and the facts sustain this view? Let it be remembered we are advocating the doctrine that it is *one* of the modes of death, not the exclusive mode, but still, we believe, the most frequent one of all.

"There are two modes of death from chloroform—the first, *and most frequent*, sudden death at the early stage of its influence; the second, a gradual mode, the comatose state, etc." (*Sansom*, p. 72.)

It is to the first class alone the doctrine we have presented pertains. And, first, we say, it is consistent with analogy. That sudden impressions upon the peripheral extremities of nerves produce profound effects upon internal and vital organs is one of the best known facts of physiology. The cold water that, slowly applied to the hands and face, produces no perceptible influence upon a person, when dashed in his face causes immediately spasmodic efforts of respiration—catchings for breath, and consequent irregularity of the action of the heart. If it be objected that the effect is not profound enough to make the cases parallel, we reply that the exciting agency being increased in power, from water to chloroform, or the nerves affected by the agent increased in sensibility as from those of the external to the internal surface of the body, we may look for proportionably greater effect. But there is a more direct answer than this; half a pint of the same agent, water, drank ice-cold in certain states of the system has over and over again caused instantaneous death. Moreover, we say that in such cases death was caused by a profound impression upon the nerves of the stomach reflected upon the heart, and we call it death by shock. Again, the same is true of alcoholic drinks, between the effects of which and of anæsthetics there is so close a parallel; the brandy which, diluted and slowly drank, produces only intoxication, when drank clear and at a draught causes instant death. And we say, too, that this was death from shock.

This theory agrees with the manner of death. It is sudden; the inhalation seems going on well, when all at once the patient starts up or struggles a moment, or suddenly turns pale, and is dead; "like an electric current arrested in its course." Just so death from *emotion* takes place, and death from emotion is death from shock.

It explains the *early deaths*. Can as much be said for any other theory? We believe not. It is not necessary for death to be produced in this manner that the inhalation should have been long continued, nor that much chloroform should have been poured out for administration; the sole condition is that the patient should get a single inhalation of vapour entirely or nearly undiluted with air; the sudden impression on the vast ramification of nerves is made, transmitted, reflected, and death occurs. A moment of inattention on the part of the administrator, a hasty or incautious increase of the amount on the cloth or sponge, and it is done.

It will undoubtedly be advanced here that the air-passages do not bear with impunity very strong chloroform vapour, but coughing is produced, leading to temporary suspension of the inhalation. We admit the fact, but see no difficulty in it. It is only exceptionally, without doubt, that chloroform vapour of sufficient purity to produce the fatal impression can pass the glottis; yet that it *may* do so at any moment is clearly reasonable, for that the watchful guardians of this vital inlet to the body may be *surprised* we all know, or at least we use the term to explain to our satisfaction the fact that a solid body of considerable dimensions, even such a prickly object as a cockle-burr, can be drawn by a sudden inspiration into the larynx or trachea. So, exceptionally, may chloroform vapour of unusual strength gain access, and it is precisely this rare and exceptional occurrence of these early sudden deaths under chloroform which has rendered their explanation difficult.

This theory will explain the deaths which have occurred after previous safe inhalation of the vapour. That sudden death should occur to a patient who seemed from previous repeated inhalations beyond the possibility of meeting with accident was so singular a fact as to attract unusual attention, and numerous explanations were advanced to account for it; none of them were entirely satisfactory, and none of them, we believe, will cover the ground so fully as that of shock.

We have now to examine how such a view of the mode of death agrees with clinical experience. This is the final test of all medical doctrines, and one by which it must stand or fall. Reading over carefully the reports of fatal cases, it is surprising how frequently death occurred immediately after the increase of the amount of chloroform on the cloth or sponge or in the inhaler. We quote from Dr. Sabarth's Case 84; 'the patient was a boy, the operation for double strabismus.

"Chloroform was administered upon a piece of lint and produced no unusual symptoms. After three or four minutes the operation was commenced, and, as signs of sensibility manifested themselves, a fresh dose of chloroform was applied. Scarcely had this been done when the countenance of the patient became deadly pale and the pulse, which was just perceptible, disappeared."

This is a type of many of the cases which can be found in the list of chloroform accidents. Looking over M. Perrin's list we find no less than nine which followed very closely this course.² It is not necessary to quote them; several can be found in Snow's list. We believe this explanation especially applicable to those cases where there has been a prolonged struggle between the anæsthetizer and the patient, either from timidity on the part of the one or from the latter being of that class of subjects, robust, muscular, and perhaps given to strong drinks—in which the stage of excitement is always longer and more marked than in others. After much time has been fruitlessly expended, patience is exhausted, and a new supply of chloroform is added intended to be sufficient to terminate the contest at once. It does so, but unfortunately in a manner entirely different from what was intended.

But there is also good authority to support this view; if our other positions have all been assailed, we will fall back upon that. Being a question appertaining to the nervous system, we may say that the authority we adduce is of the very highest character:—

"It is by the reflex influence due to the *sudden* irritation of the branches of

¹ From Medical Times and Gazette, Oct. 9, 1858.

² Cases xi., xii., xvi., xviii., xxvii., xxxv., xl., xlvii., lxxi.

the par vagum in the lung that chloroform has killed in the very rare cases in which the heart's action has been stopped before the respiration." (BROWN-SÉQUARD, *Lectures on the Physiology and Pathology of the Central Nervous System*, p. 160.)

The eminent physiologist is speaking of animals, yet notably, they are more difficult to kill with chloroform than man; so much so, that it is denied by most writers that they can be destroyed at all by the influence of the agent on the heart, and maintained that they always die by failure of respiration from prolonged administration of the vapour. If true of animals, it certainly is true of man.

We do not know that Dr. Brown-Séquard has ever written more fully upon this view of death by chloroform than the few lines quoted above. If he has ever elaborated the above paragraph in any article or work, we have not met with it. Yet brief as is this statement, so consistent is it with reason and with clinical experience, and so high the authority from which it emanates, that we can furnish no explanation of its being entirely ignored by every author who has written upon anæsthesia from the time it appeared in print until the present.

But death may still take place by shock, the initial impression being different—a sudden and profound excitation of the nerves on the cutaneous surface of the body. The able authority we have just quoted gives some striking examples of a sudden suspension of the heart's action from such a cause, and looking over the list of fatal chloroform cases, we find abundant additional evidence. In quite a considerable number of the cases death followed immediately on the first entrance of the surgeon's knife. This was the case in the only instance of death seen by Mr. Lister, already alluded to; the patient started and died as a single sweep of the knife amputated the penis. The author alludes in a note, briefly, to Mr. Bickersteth's observations and opinion, which are given more fully by SNOW (p. 240). This gentleman relates three instances in which the pulse suddenly ceased as the first incision was made by the surgeon, and then in a few seconds recovered itself; and he believes that the stoppage of the pulse was the effect of the shock of the incision. SNOW dissents from this opinion, and thinks it more probable that the cessation was caused by the profound influence of the chloroform. Nevertheless, SNOW's own report of the case of diseased heart, observed by him, where lithotomy was performed with and without chloroform, and which we have already mentioned, is a striking example of the influence of a peripheral excitation, or pain, upon the regularity of cardiac movements.

M. Perrin considers, at length, the influence of the intervention of the surgeon in producing death, and admits its importance, although with him the fatal event is brought about by "syncope." He notices Mr. Bickersteth's observations, and also the investigations made by M. Vigoroux to elucidate this important clinical fact.¹ The conclusions of this gentleman are that the influence of the sensory nerves upon the circulation exists even during the anæsthetic sleep; that it appears to be augmented; that it may be of such degree as to arrest the movements of the heart; and that this was the cause of the majority of deaths from chloroform. Now, as M. Perrin justly remarks, since less than half of the deaths occurred "during the operation," the latter conclusion cannot be true, and he arrives at what we fully believe to be the true solution of this matter; it is only in a certain stage of the anæsthetic process that the sensory nerves can exert this influ-

¹ The reference is to "De l'influence de la sensibilité sur la circulation pendant l'anæsthesia chirurgicale."—*Comptes rendus de l'Académie des Sciences*, t. lii. p. 291.

ence upon the circulation ; during *incomplete anæsthesia* the heart's action may be thus affected, when it is *complete* the source and origin of the impression, sensibility, is abolished.

"Observation in man confirms this view. We have taken the pains to watch the state of the pulse in eight patients during the entire duration of anæsthesia, and we have seen that at the moment of excitation, whether initial or repeated, it marked the reactions indicated by M. Vigoroux, even upon the occasion of slightly painful impressions, the pricking of the suture needle for instance. But, confirmed anæsthesia, as we have defined it, once obtained, the pulse does not betray, in any manner, the *contre-coup* of the operation. The circumstances under which the accidents have happened witness the same thing. Of the eighteen cases of sudden death occurring during the operation, there were ten in which the anæsthesia was manifestly incomplete." (p. 413.)

We think this will answer a question which we could not fail to anticipate, and which, most probably, some of our readers have already put. What is the good of all this minute inquiry as to the exact mode of death by chloroform, and which has so much the appearance of pathological hair-splitting? It is answered, in part, by the latter portion of the above quotation. If there is any possible way of avoiding a death it should be known, understood, and practised upon, and the plain, practical lesson from the above is, that *complete anæsthesia is better than partial*. Better, because safer; a *little* chloroform, so often mentioned, is like a little learning, a "dangerous thing," while full doses carry their own protection from evil.

So in regard to the other channel by which a fatal influence is conveyed to the heart, death occurring from a profound impression suddenly made upon the ramifications of nerves in the lungs. The practical lesson is plain; avoid the danger by a slow and careful administration of the agent. Everything goes to show that it is the *sudden* impression of the agent which causes the shock, and this being understood the danger can be easily avoided. This danger is acknowledged and taught by most of the authors under notice, and it would be manifest injustice not to mention the fact. We have differed from them as to the *modus operandi* of the agent in producing death, but we could not express any more clearly the recognition of danger in sudden interruptions in the inhalation, or warn any more distinctly against them.

"Rapid and *brusque* inhalations, in which a large quantity of chloroform is given at once, are particularly injurious. First they may poison the patient; but this is the least danger, since it is easily avoided. The greatest objection to them is that they act upon the nervous system by shocks and jerks."

"Experience has demonstrated that among all preventive measures the most important is to proceed with the inhalation very slowly, avoiding all sudden disturbance, all shock to the nervous system." (*Perrin*, pp. 410, 411.)

"In the case of strong atmospheres the danger is due, not only to the quantity of chloroform present, but to the rapid and sudden influence produced." (*Simsom*, p. 83.)

"I am quite sure that the danger of chloroform is not proportionate to the quantity retained in the system—it is its early influence, the '*brusquerie*' of its action which has caused the great part of its fatality." (p. 84.)

"Commence the inhalation gradually. Use no force if it can possibly be avoided. * * * Recollect that any sudden increase in the strength of the vapour may produce sudden syncope." (p. 134.)

The latter quotation is from his chapter on the "practical rules for the administration of chloroform," than which we do not know a better chapter in any book of any language; it is a safe guide for the practitioner

whatever views may prevail as to the particular mode by which death is caused.

It will have been observed, without doubt, that the tendency of the doctrines we have advanced is to bring the deaths from chloroform to the door of the administrator. We accept the conclusion, for we think it cannot be escaped. Deducting those cases in which emotion played the chief part in producing the fatal event, and those in which the anæsthetic was but one of the "factors," we believe the others were nearly, if not quite, all due to mal-administration. The vapour was given too rapidly, of too great strength, too suddenly, or, in rare instances, for too long a period. The facts sustain this view; the number of deaths from self-administration, the number in the hands of unskilled administrators, as dentists, the manner of death, the circumstances of the administration, the symptoms in cases where death was threatened, but did not take place—all concur in placing the chief responsibility upon the mode of administration and the dose of the remedy. Authorities support this view, and have always done so. It was the essence of Snow's theory that death resulted from too large a percentage of chloroform in the blood, and might always be avoided by restricting the amount. But the fault of his theory was that it took no account of the rapidity of inhalation as bearing on the question of death, and we have seen how very important a part is played by sudden changes of the rate of administration. The authors whose works are under notice generally sustain this view. Sansom says: "It is very certain that want of caution has had its influence in the production of the fatality;" and again "some of the deaths would not have occurred had the chloroform been cautiously and fairly administered."

This doctrine is distinctly inculcated by Mr. Lister. He is trying to account for the deaths having been so much more numerous when the anæsthetic was administered for trivial operations:—

"When some great operation is to be performed, like the amputation of a thigh or the removal of a stone from the bladder, plenty of well qualified assistants are present, and each of them, including the giver of the chloroform, is duly impressed with the importance of his office, and bestows the requisite pains upon it. But when some trifle is to be done, the whole affair is apt to be regarded too lightly, and the administration of the anæsthetic is perhaps confided to some unsuitable person who also allows his attention to be distracted by other matters."

Dr. Ellis says: "It is, however, only too probable that a still larger proportion of the fatalities laid to the charge of chloroform, might more correctly be ascribed to the mode in which it was given."

There is a table in Dr. Anstie's work from which can be drawn an argument bearing upon this question. Dr. A. has had twenty-one cases in which alarming symptoms occurred out of a total number of 3,058 administrations, or 1 in about every 145! a most surprising proportion, and one which, if generally observed, would, we believe, soon pretty nearly do away with anæsthetics altogether! We felt compelled to try and find an explanation of so singular an occurrence, and one differing so widely from general experience. We think we have found it in the columns which give the dose of the remedy and the period at which the symptoms occurred. From one to three drachms was the quantity; none less than a drachm; too large a dose, we maintain, to be safely commenced with from lint or a handkerchief. In Case 5, $\frac{3}{4}$ was given on a handkerchief, and the alarming symptoms began in less than half a minute; in Case 8, $\frac{5}{8}$ were given, and the symptoms began "after a very few deep inhalations;" in Case 11, $\frac{3}{4}$

on lint, and "after a few inspirations," Case 14, the same exactly : and so on. Is it possible not to connect the alarming symptoms with the mode of administration in these cases? We think not, and we find in this curious table, the like of which we do not believe could be furnished by any other person, several most important practical lessons and strong evidence in favour of the doctrines we have maintained in this article.¹

It seems to us passing strange that the influence of the mode of administration in occasioning death should have been so generally ignored by writers on chloroform. Reluctance to advance any doctrine likely to cast blame upon members of the profession may have contributed to this, and it would be laudable were blame the necessary consequence, which we cannot admit. But even if it were, it should have no influence in a question of science. Whatever the explanation, the fact remains the same; every explanation seems to have been preferred to this. Now there are three *elements*, so to express it, entering into the process of anaesthesia—the remedy, the patient, and the mode of administration. An impure article of the remedy was maintained as the cause of death as long as it could be; then everything faulty on the part of the second element, the patient, was advanced; idiosyncrasy, diseased heart, and, worse than all—when patients died after having previously inhaled it with safety—the doctrine was brought forward that persons did not always respond alike to its influence! The third element seemed forgotten, yet it is not only likely to be uncertain, but one positively impossible of being uniform under the most usual mode of procedure. The vapour of a liquid is administered whose rate of vaporization differs so much at ordinary temperatures as to be double at one time what it is at another;² the liquid is poured by guess on a handkerchief or towel, and held at varying distances before the mouth and nose of a patient, whose rate and depth of respiration vary from moment to moment! And yet, when death occurs, it is assumed, generally, that this process is a uniform unvarying thing, and the deviation from the normal course of events is looked for in the impurity of the remedy or some condition of the patient!

It is chiefly by a more careful administration that we believe children have so generally escaped accidents with chloroform. That they are not absolutely secure we have seen, while numerous theories have been advanced to explain their great proportionate immunity. None of them are entirely satisfactory, while some undoubtedly express a portion of the truth, which is all we will claim for this one. As Mr. Lister maintains a greater bestowal of care upon every step of capital operations, and seeks in that way to account for the greater safety of patients anaesthetized for such a purpose, so we seek in the tenderness of the child-patient, the evident weakness of the trembling form compared with the strength of the giant we hold in our hands, an explanation of its safety under chloroform. The absolute, pressing need of caution and care are forced upon our attention with a power which it is impossible to escape.

It is not consistent with the operations of the human mind that so serious a matter as danger from chloroform should exist without various and persistent attempts being made to remedy it. Different propositions have been made for this purpose from time to time. The first we examine is

¹ This table is quoted by Sanson, but the amount of chloroform given is omitted—a most important point.

² "Air at 40° Fahr. can retain 6 per cent. of chloroform vapour; at 60°, 12 per cent." (Sanson, p. 22.)

the substitution of ether for chloroform. That the stronger agent acts more promptly, more pleasantly, and that with it anæsthesia is more easily as well as more rapidly produced, is not denied by the advocates of the weaker, and the sole question to be decided is as to the relative amount of danger in the two. It is claimed by the advocates of ether, by some of them at least, if not by all, that it is essentially harmless—that no well-authenticated case is on record in which death can fairly be attributed to this agent. This claim cannot be allowed upon the testimony of the authors before us. Dr. Sansom alludes to nineteen cases of death from ether, as collected and published by Trousseau; the details are wanting, yet the high authority for the statement will generally be considered a sufficient voucher for its truth and justice. Dr. Sabarth quotes the second of the conclusions of the Boston Society for Medical Improvement—(“It is a generally accepted fact that ether is less dangerous than chloroform”)—and adds the following paragraph:—

“Thirty-six cases of death from ether are known to have been collected, so that in proportion to the frequency of the administrations of chloroform, and of the much less frequent use of ether, the number is a very large one.” (p. 154.)

He believes that chloroform will remain the principal anæsthetic.

M. Giraldes, in the *Dictionnaire*, examines this question at considerable length. He decides, *a priori*, that the inhalation of ether cannot be absolutely free from danger, and that in claiming that it is so the medical societies of Boston and of Lyons have advanced a proposition “much exaggerated.” He finds this decision supported by the facts; he examines the cases given by the Boston Society, and says: “This collection of facts, to the number of twelve, show well that the ether has been one of the factors, if not the principal factor, which has occasioned the death;” and thinks the “American surgeons, devoted partisans of ether, carry their enthusiasm too far.” Upon the persistent attempts which have been made to explain away the agency of the ether in bringing about the fatal result, he makes an excellent point:—

“We are obliged to remark, that if in examining the accidents attributed to chloroform, the same vigorous method had been pursued as has been followed with those attributed to ether, assuredly we should have arrived at a diminution of the number of the mortal accidents which cast a shadow over its history.”

M. Perrin gives the details of three cases of death from ether. Following the same rules of examination which we should do in regard to chloroform, we reject two of them as not fair cases. In one, at Lyons, the patient was very feeble and prematurely aged, and was advised not to inhale the ether; in the other, at Bellevue Hospital, under Dr. Alonzo Clark, a post-mortem examination revealed a tumour in the right lobe of the cerebrum. The third case we consider an undoubted case of death from ether.¹

There is another clear case of death from ether on record in this country. We allude to the case reported by Dr. W. H. Mussey, of Cincinnati.² If the agency of the anæsthetic has been successfully explained away in this case, we have not met with it. Dr. Sabarth copies it into his work without expressing any doubts.

¹ The references in M. Perrin's work are carefully given, with the exception of this case! It is not stated where it occurred, or under whose care! The reference is to *Journal Connaissances Méd. et Chir.*, 1842—the date evidently a typographical error. The patient was a Bavarian, it was in an hospital, and Charrière's instrument for the ether was used.

² Cincinnati *Lancet and Observer*, January, 1861.

The relative danger of the two agents then is a point difficult to determine, impossible without figures, which cannot be obtained. Our belief is, that did we know the total number of inhalations of chloroform with 200 deaths, and the total number of etherizations, allowing only the two undoubted cases of death mentioned, the ratio of deaths in the latter would be fully equally to that of the former. The general verdict of authorities is that ether is less likely to occasion death than chloroform, because a weaker agent, and, therefore, better for careless or inexperienced administrators. In our own opinion it is impossible to occasion death by shock with ether; not only a possible but probably a frequent mode of death by chloroform. In this respect the two agents differ just as wine differs from ardent spirits. Enough of the former could not be drank off at once, or would not produce a sufficiently profound impression upon the nerves of the stomach to produce the instantaneous death sometimes caused by the latter. But so far as utility and the demands of practice are concerned, the question has been emphatically decided by the profession—it is pretty nearly Boston and Lyons against the civilized world. Nor do any of the reconsiderations which are from time to time urged upon the profession affect the decision: "As the matter now stands, the use of chloroform is increasing, that of ether diminishing." (*Sansom*)

The doctrine of Snow that death was alone caused by breathing air too highly charged with chloroform vapour leads directly to the use of an inhaler, an instrument which would always regulate the amount of vapour administered, as a preventive of accident; and since his time there have now and then appeared advocates of inhalers, who would fain make the profession believe such an apparatus to be indispensable, that his own instrument is the best, and by the use of which all danger can be avoided. So little effect, however, has been produced upon the profession, in this country at least, that inhalers might be dismissed without a moment's consideration. As Dr. Sansom, however, again appears as the advocate of an apparatus, and as it appertains to the subject, we give it a passing notice. Among the authors under review we find Sansom, Ellis, and Austie in favour of the use of inhalers, and Lister, Sabarth, Giraldes, and Perrin opposed to them. The objects to be obtained by them is the insurance of an atmosphere of uniform and moderate strength, not containing above a certain percentage of vapour, Dr. Austie gives 3.5 per cent., and thinks such an instrument would insure the perfectly safe administration of chloroform. Dr. Sansom has invented a special inhaler, constructed with two principles in view—a definite dilution of the vapour and a gradually increasing strength of it, and thinks he has improved upon Snow's, although in regard to Mr. Clover's instrument he expresses himself as considering it "the safest method of all for the administration of chloroform." Mr. Clover's plan is to use a bag large enough to contain the air for the respiration of several patients during inhalation; into this is introduced sufficient chloroform to give accurately a strength of 4.5 per cent., and, by means of a valve near the mouth-piece, even less than this is administered at first. The bag is attached to the coat or around the neck of the person giving the anæsthetic, and is, of course, costly, cumbersome, and formidable in appearance to timid patients. In Dr. Austie's opinion, too, this is the best apparatus, although Sansom's inhaler had not been presented when his book was published.

The argument in favour of inhalers made by the chloroform committee, based upon the fact "that not less than 80 per cent. of the fatal accidents with chloroform have arisen when it has been given on a handkerchief,

lint, or sponge," we do not consider of any weight, because the number of administrations without an instrument so vastly exceed those with one. Any argument in favour of them, based upon economy in the amount of the anæsthetics used, is unworthy of a moment's consideration. None can certainly be founded upon their superior convenience, for all of them require special study and care in their management. This is especially the case with Dr. Ellis's, an ingeniously contrived instrument for insuring definite amounts of vapour from several fluids of different rates of vaporization, probably well effecting the end in view, but complicated, according to his own testimony, requiring study, and, we believe, utterly impracticable in daily life. It will not do, especially for Dr. Sansom, to base any argument upon the number of times any one of them has been used without accident, for we should turn against him his own reply to those who claim special immunity from accident on account of having followed some special mode: "If you had given chloroform ten, or even twenty thousand times, and had then met with a case of death, you would but have received your just proportion according to recorded cases." The only satisfactory proof would be absolute immunity from accident when an inhaler was used; unfortunately this cannot be furnished. In Dr. Anstie's table of 21 cases in which alarming symptoms occurred, Snow's inhaler was used twice, alone. Another important fact is learned from this table, as well as elsewhere; in one case Weiss's inhaler was used, but was "out of order!" That the mechanism of tubes and valves may become deranged, and thus introduce a new element of danger into the process, is an important fact, and a most serious objection to all these instruments.

"The employment of inhalers is not only an embarrassment in practice, but we will go further, and say that it introduces a cause of danger." (*Giraldes.*)

"Inhalers have also their sombre list. * * * In the sixty cases in which the manner of administration is indicated an inhaler was used twelve times. * * * Thus in one-fifth of the fatal cases a mechanical apparatus was employed, a proportion which is very considerable when we take into account the limited use of them. * * * It suffices for us to draw this conclusion, the immunity promised in their name remains thus far a Utopian idea. It is a philanthropic dream, but it is only a dream." (*Perrin*, p. 461.)

If we needed any more authority, we should find it in the practice of the most eminent surgeons of the world; those who use chloroform the most frequently, administer it in the most simple manner. Velpeau, Larrey, Cloquet, Nelaton, Caseaux, Jobert, Huguier, Simpson, Syme, Druitt, Erichsen, all reject inhalers. We will not say that there is no such thing used in this country, but we certainly do not know, and have never heard of a surgeon in America who uses them, nor of a respectable authority for their use.

But, in spite of all this testimony, if the question were simply between an inhaler and the most frequent mode of administering chloroform, upon a handkerchief, thick towel, or some article nearly impervious to air, we should prefer the former, believing the latter to be the worst possible plan. There are elements of safety in inhalers; they secure definite dilution of the vapour, and prevent those sudden irregularities and shocks with the vapour, which play so important a part in the production of danger; hence, they are certainly safer in unskilled hands. With the exception of Mr. Lister, the testimony is unanimous as to the evils of administration from a handkerchief:—

"The great objection to the administration of chloroform on a handkerchief is its irregularity—the utter ignorance we have of the strength of the vapour

inhaled at a given time. At one moment a quantity of air strongly impregnated with chloroform may enter the lungs; at another, a breath may be taken of almost pure atmospheric air." (*Sansom*, p. 79.)

This we know from personal trial; a mere change in the position of the handkerchief may give a whiff of the vapour which is overpowering. Add to this the widely different rate of vaporization of chloroform at varying temperatures of the atmosphere, and the great irregularity of this mode of administration is manifest. The article upon which the chloroform is sprinkled should be porous, and sufficiently so to admit of free respiration through it, and which will insure the entrance of the vapour to the lungs well mixed with air, and not in *strata*. Nothing meets the necessities of the case better than sponge; not a flat or round piece, upon which the liquid is poured and held under the nose, but a cup-shaped piece, fitting over the respiratory orifices. Such a piece, well squeezed out of water, a few drops of chloroform sprinkled on it to begin with, and pressed gently so as to carry the anæsthetic to all the interstices through which the air will pass, affords the best possible instrument for everyday practice. If any one, accustomed to the use of a napkin or handkerchief, will try this plan, we feel confident he will be surprised at the ease and regularity of the production of anæsthesia, and the small quantity of the liquid used.

The use of a mixture of anæsthetic vapours as a means of escaping the dangers of chloroform, is the proposition at present attracting the most attention, and one, we believe, which deserves the most careful consideration. Such mixtures have always been more or less used, but the Report of the Chloroform Committee of the Medico-Chirurgical Society of London first distinctly and unequivocally declared their superiority, and placed upon their use the seal of authority. This was so recent that it is only in the latest works of our list—those of Drs. Sansom and Ellis—that we find any adequate mention of the subject. M. Perrin gives an account of the only death known to have taken place under a mixture of ether and chloroform. The case occurred in this country, and was reported in this journal for July, 1857; the patient was a child five years old, the operation removal of a tumour, and four ounces of blood were lost during the operation. That the principles of administration were not as well known then as now is very certain, and may be fairly urged in reference to this case, even were there no unfavourable "factors" present, a severe operation and loss of considerable blood for a patient of that age.¹

The object of anæsthetic mixtures is the avoidance of danger, especially of that danger arising from the depressing influence upon the heart's action which chloroform most certainly exerts, which ether does not exert, although the evidence is insufficient to convince us that it stimulates the heart, as alcohol certainly does. The committee proposed three mixtures:—

A. Alcohol	.	.	.	.	.	.	.	.	.	1 part.
Chloroform	.	.	.	.	.	.	.	.	.	2 parts.
Ether	.	.	.	.	.	.	.	.	.	3 parts.
B. Chloroform	.	.	.	.	.	.	.	.	.	1 part.
Ether	.	.	.	.	.	.	.	.	.	4 parts.
C. Chloroform	.	.	.	.	.	.	.	.	.	1 part.
Ether	.	.	.	.	.	.	.	.	.	2 parts.

The introduction of alcohol is a novel feature in one of these, and Dr. Sansom gives the credit of originating this mixture to Dr. Harley. There

¹ Snow does not hesitate to say that the patient died of hemorrhage.

is no doubt that the alcohol plays a very important part in addition to and independent of its stimulating effects, either by modifying the influence of the others, or in affecting their vaporization, or both. The committee says it is by "the uniform blending of the ether and chloroform when combined with alcohol, and probably the more equable escape of the constituents in vapour." Dr. Ellis says "the chloroform is, after all, the potential agent; the others are chiefly adjuvants;" * * * "vehicles and diluents of the chloroform." Dr. Sansom¹ gives strong testimony as to the stimulating effects of this ingredient, counteracting the depressing influence of chloroform:—

'In my own experiments I have found that alcohol has had the greatest effect in sustaining the heart's action during the influence of chloroform. I can particularly recollect one instance in which alcohol, having been administered in vapour to a frog, it was impossible to cause death by any strength of chloroform vapour. I certainly think that a dilution of chloroform with alcohol is advisable in many instances, and I am quite sure that the administration by the stomach of a little alcoholic stimulant acts beneficially.' (p. 140.)

Dr. Ellis has made the administration of mixed vapours his special study, and is their especial advocate. He believes that anæsthesia by this method "has been proved to be the safest, the pleasantest, and the best, in its total results." A large part of his small book is taken up with experiments upon the differing rate of vaporization of the fluids and the means he has tried to equalize it. In this he claims to have succeeded as well as in devising an apparatus which insures the administration of a larger than usual amount of the vapour of alcohol. In everything relating to these parts of the subject his work is very complete, and his reasoning is good.

The objections urged to anæsthetic mixtures are: 1. The length of time required for the process; 2. The probability of sensibility not being abolished (Sansom); and, 3. The unequal rate of vaporization of the fluids (Ellis). The first two cannot, in our opinion, be sustained. The third "introduces a new element of danger." It was first advanced by Snow. He says when ether is combined with chloroform "the result is a combination of the undesirable qualities of both agents, without any compensating advantage," and that there is great danger because the operator, towards the end of the process, may be giving pure chloroform when he thinks he is giving the weaker mixture of vapours. So positive a judgment by such eminent authority postponed the use of mixed anæsthetics in our hands for many years. Still, the facts of unequal evaporation, and consequent danger remain the same. Dr. Ellis says:—

"Out of the six or seven minutes occupied by the evaporation of the half drachm of fluid, the first was occupied chiefly by the ether, the next three by the chloroform, with a little alcohol, and the last by the alcohol alone. In an inhaler, the patient would have breathed, for one-fifth of the time, chiefly the vapour of ether; for the next three-fifths, that of chloroform with a little alcohol; and at last only the vapour of a minute quantity of alcohol." (pp. 24, 25.)

We fully recognize the danger, then. But it is precisely one of the best of dangers; if we are allowed such an expression. Best, because being

¹ Dr. Sansom has lately advocated, before the Obstetrical Society of London, a mixture of equal measures of chloroform and absolute alcohol, as "an excellent anæsthetic, which gives off a proportion of chloroform vapour in a given time, almost exactly half of that which is given off by chloroform pure and simple." It is this mixture, we understand, which was employed some years since in the Massachusetts General Hospital under the name of chloric ether.

known it is easily avoided; the only precaution necessary is for the operator to squeeze out his sponge napkin or lint from time to time during the administration, and make a fresh application from the bottle.

Our own experience with mixed vapours, and we have used only mixture A, has been exceedingly satisfactory. Our experience has not been great, but we have never been much longer in producing anesthesia and have never failed of making it perfect. One case which fell under our observation afforded an opportunity of contrasting the effect of the mixture with that of undiluted chloroform and presented a striking instance of its superiority: A young man, muscular and robust, from appearance probably a moderate drinker, presented himself at our office with dislocation of the shoulder of five weeks' standing. Before attempting reduction he was placed under chloroform, and the symptoms were by far more unpleasant than we had ever before or since met with. The struggling was great, the suffusion of countenance extreme, the respiration irregular and catching, and the veins of the neck and face turgid with blood; it was only with the greatest caution that we carried him to the stage of complete relaxation. The attempt at reduction failed, and in an hour or so he consented to a second attempt. This time we resorted to the mixture, and the contrast was striking; he went under its influence with no more than ordinary difficulty, if as much. The influence of the previous administration of chloroform in changing the patient's condition—the only "element" in the case which could be modified—we cannot estimate very highly, and therefore look upon it as a fair instance of the comparative effects of the mixture, and pure chloroform.

In our opinion anæsthesia by mixed vapours is destined to increase in use and in favour with the profession. The method seems especially adapted to cases in which the operation is likely to be of some duration, or accompanied with much hemorrhage, or other depressing circumstances, and those who believe in inherent and unavoidable danger in chloroform should by all means resort to it.

But whatever anæsthetic may be chosen, ether or chloroform, the pure article or the mixtures, and whatever instrument or mode of administration may be preferred, nothing will obviate the necessity of *care* in the administration of these powerful agents. This is at once the teaching of reason, of experience, and of the best authority. They have been too long and too frequently intrusted to unskilled hands, a dresser or student, and the wonder is that death has not oftener occurred. Happily, this custom is passing away, and the necessity for careful study of the subject is fully recognized.

"We believe we shall render a veritable service if we vulgarize this idea that anæsthesia should be observed and studied at the hospital with as much care as every other subject of practical medicine." (*Perrin*, p. 417.)

"The administrator should be experienced. It has been in some cases a custom to intrust the chloroform to a young dresser—one who might be more anxious to watch the progress of the operation than the stage of the narcosis. This is a state of things to be deprecated, and several hospital committees have acted wisely in appointing a Chloroformist—a measure which is not of less value to the operating surgeon than it is of benefit to the patient. One who administers chloroform in any case should confine himself exclusively to the task he has undertaken, and should constantly mark the symptoms." (*Sansom*, p. 131.)

There is no one point attention to which alone constitutes care in administering anæsthetics. There are three indices of danger—the pulse, the respiration, and the countenance; attention to all of them is necessary, for a change in one or the other has always marked the appearance of alarming symptoms.

"The administrator should observe the countenance, the respiration, and the pulse. There has been too much dispute as to which should receive most attention. Some writers have urged attention to the pulse to the exclusion of the breathing, others *vice versa*. The truth is, to my mind, that all the signs should receive attention—none more than the others." (*Sansom*, p. 134.)

The only exception to the inculcation of such doctrines is Mr. Lister. We have already seen that he neglects attention to the pulse, and we regret to find that he fails to impress that caution which we believe to be so necessary, and that his language is such as to allow the student to infer that, after all, anæsthesia is a trifling process, requiring neither special study nor experience.

With this exception we know of no authority which does not urge in the strongest terms the necessity for caution in the administration of these agents. Even M. Sédillot, who promulgated early in the history of anæsthesia, and ever since, the doctrine that "chloroform, pure and well administered, *never kills*," is careful to teach with it that anæsthesia "is an art which requires attention during every moment, much skill and experience," because "every time chloroform is administered life is at stake."¹

Drawing our work to a conclusion and surveying carefully the ground we have passed over, we ask, what is really the amount of danger? how high shall we estimate liability to accident, the one drawback and objection to anæsthetics? It cannot be given in figures, but must be estimated, and find expression in general statements. We draw the conclusion that it is very small indeed from Mr. Lister's article alone. He pursues a mode of administration which we believe to be faulty in the extreme, does not teach very strongly the necessity of special study or experience, has evidently seen a vast number of administrations, and yet has no fear whatever of the agent. He says "it may be used so as to be practically free from any risk whatever;" and we think he furnishes himself the strongest illustration of the fact!

Dr. Anstie does not place the estimate higher, although he has witnessed one death from it, and met with alarming symptoms far more frequently than falls to the lot of most men. He does not hesitate to counsel its use upon every occasion. In the following extract the italics are his own:—

"It is my firm persuasion that, with proper care, chloroform may be safely administered *to any patient who is fit to undergo an operation at all, whether there be any existing disease of heart, lungs, or brain, or not*. I have never allowed the known existence of such disease to prevent my administering it, and I have never found any evil result. I entirely concur with Dr. Snow's opinion on this subject." (p. 384.)

Dr. Ellis, a special pleader for the superior safety of mixed vapours, speaking of the danger from chloroform, says:—

"The risk is, of course, small; all statistics go to exhibit that important and reassuring fact." (p. 1.)

We translate from Dr. Sabarth's preface:—

"From a statistical point of view it must be confessed without restriction, that the evil consequences of this wonderful agent, whether of temporary duration or fatal nature, appear minute when compared with the innumerable multitude of fortunate results which almost every country of the civilized world can show, and can scarcely be considered of any weight in the decision of the question."

¹ See an article in Cincinnati Journal of Medicine, Aug. 1866, translated from *Gaz. des Hôpitaux*; and his *Médecine opératoire*,

M. Perrin, who believes, as we have seen, that there is and always will be danger in chloroform inhalation, and that our chief advance will be by learning better to whom to give it, speaks hopefully of the future :—

“We are making progress: we have made it in the past and shall continue to do so in the future, and the mind can foresee the time when the skill of the administrator will enable him to escape every evil predisposition.” (p. xiii.)

Sansom says :—

“I believe that the facts warrant the conclusion that the dangers of chloroform have been exaggerated.” (p. 10.)

“From all the considerations I have advanced, I think the following conclusions may be drawn: That though chloroform has in many instances caused death, it has not the fatal power which might at first sight appear. That, excluding the various chances which all chloroformed and not chloroformed must submit to, by utilizing our increased knowledge, and exercising an increased care, we may deprive it of all its terrors.” (p. 17.)

The amount of danger is not only small but, more important far, it is in a great degree preventable. Probably we shall continue to have deaths from emotional causes so long as the human mind continues what it is; so long as the body remains what it is we shall have those deaths in prolonged operations where chloroform is “one of the factors” in producing it. But with “our increased knowledge, and exercising an increased care,” we look for the others to disappear from the annals of medicine. Nothing will tend so powerfully to promote this result as a careful study of the chloroform literature of the present. Not only will such a study increase the frequency of its use until the axiom of Syme is generally accepted, that “every case for operation is a case for chloroform,” but it directly and powerfully adds to the safety of the patient and the comfort of the operator. No contrast can be greater in either respect than that between an administrator of anesthetics, who is timid, and justly so, because he is a believer in the pernicious doctrine that no reliance can be placed in the regularity of their action, and one who is imbued with the doctrines that irregularities of action arise from irregularities of administration, who has confidence in his remedy and feels that he has the power to control it. The one dreads the arrival of the hour for the inhalation, and thanks his stars when it is safely over; he is fearful, and administers the vapour irregularly; while the patient, escaping the dangers of inhalation by jerks, is exposed to those arising from incomplete anesthesia, and the surgeon is annoyed and baffled in his manœuvres by the struggles of partial sensibility. The other proceeds steadily but cautiously to the end in view; he “makes haste slowly,” and with a boldness tempered by wisdom carries his patient down into the dark valley which borders on death, drowns human agonies in the waters of Lethe, and triumphs in the crowning glory of his art.

If the present of anesthesia is cheerful and satisfactory, the future, too, looks bright and promising, and we cannot close without calling attention to the fact. The number of agents known to produce anesthesia, the extent to which they are being tried, and the amount of attention directed to improving this branch of our art, all give evidence of farther advances in our knowledge. We think no one can rise from a careful study of the present condition of the subject without feeling convinced that we shall not much longer be limited to the agents now known, and that the day is not distant when, to quote the eloquent address of Mr. Bowman to the British Medical Association, “in the sure progress of our art, some other anæsthetic shall be found without even the slight inconveniences of chloroform.”

J. C. R.

ART. XIV.—*On the Structure and Growth of the Tissues, and on Life.*

Ten Lectures delivered at King's College, London. By LIONEL S. BEALE, M. B., F. R. S., Physician to King's College Hospital, Professor of Physiology and of General Morbid Anatomy in King's College, London, &c. 12mo. pp. 219. London: Robert Hardwicke, 1865.

THE cellular composition of tissues, and the cellular theory of their development and growth, in one or other of its accepted forms, have been so long admitted by physiologists, while the more recent interpretation of this theory, and its application to pathological structures by Virchow have been received with such universal favour, that any theory which militates against it cannot but startle those who have settled into its acceptance, and must have a stable foundation to be permitted to displace it.

Founded, as is the theory of Beale, upon his own personal observations—observations which carry on their face the impress of truth and reliability, it has seemed to us that his ideas have not attracted that attention from American physiologists which they deserve. Having trained himself to most accurate execution with the pencil, Dr. Beale makes all his own drawings, and no one who has examined the cuts in any of his carefully prepared works, as those accompanying the lectures on the tissues as first published in the *Archives of Medicine*, those in either of his valuable books *How to Work the Microscope*, and *The Microscope in Clinical Medicine*, or the illustrations to his more recent labours on the direction of nerve currents and distribution of ultimate nerve fibres to muscular fasciculi, can fail to be convinced of the skill and accuracy with which his drawings are made. Nor are we compelled to rely upon our comparison of the labours with our own ideas of what they should be, for we have been informed by a medical friend who has recently had the advantages of Dr. Beale's teachings, and who saw the original microscopic appearances, that the drawings represent them most truthfully.

If there be error, then, in the theory of Beale, which we do not deny (our object being merely to make its principal points more accessible to American medical men), it must be in the train of reasoning rather than in the premises, which appear to be true.

That the theories of Beale and Virchow are opposed to each other, in a greater or less degree, is plain; but the exact nature and degree of difference we fear is not appreciated by many of our countrymen. And it shall be our aim, in the following review, to indicate, as far as possible, the points and degree of difference.

Dr. B.'s first lecture contains an enumerative review of the organic functions with brief definitions, and a slightly more extended consideration of the nature of the process of *nutrition*, i. e., "the manner in which the soluble material, which is brought into relation with a living tissue, is taken up by that tissue and incorporated with it; how it becomes converted from an inanimate into a living substance; how the whole organism grows; how tissues increase in size until the adult form is attained; how the waste resulting from action is supplied by the production of new tissues." The difficulty of answering such questions as these is admitted, and in many cases the impossibility of conclusive answer. "But by reasoning upon facts obtained by experiment, and upon the observations derived from very minute examination of the tissues with the highest powers of the microscope, inferences which in many instances probably approximate the truth,

have been obtained." The importance of a consideration of the theories advanced for the explanation of these phenomena is manifest from the fact that of late these matters have been discussed, not only in scientific books, but even in the current literature of the day. Hence medical men are at any time liable to be called upon to give an opinion regarding various points connected therewith. An additional reason for the study of these theories lies in the fact that it is impossible to know anything of the action of the body in health without investigating the minute changes which go on in the organism. "This knowledge forms the foundation of physiological science, and from this point of view the changes taking place in disease can alone be studied with any advantage. It is the natural introduction to the study of medicine." Still another reason adduced by Dr. Beale for the earnest study and advancement of every branch of science bearing upon medicine is the influence which increased knowledge must exert in exposing the false character of the many plausible arguments which are brought forward in favour of various forms of quackery. His remarks are so eminently applicable to the circumstances by which we are now surrounded in our own and every American community, and involve so entirely the only remedy for their removal, that a quotation of the entire paragraph is justified, though somewhat irrelevant to the strict purpose of the lecture.

"It is quite clear that if the principles upon which we act were as capable of proof as many of the general doctrines of chemistry, quack dogmas would very soon be exposed; but charlatans know well that the arguments from which our principles of action are deduced cannot be understood by any one ignorant of physical science, while by putting forward false premises, and drawing from these a logical conclusion, they very easily convince even an intelligent, well educated man, who is unable or disinclined to analyze their premises, that there is some reason in their statements. Depend upon it, gentlemen, the only efficient way of opposing the spread of quackery among the public is to encourage the spread of scientific investigation and a love for research among ourselves, and by this course alone shall we be able to shame those amongst us who are base enough to their profession to support and pamper an impostor or encourage a stupid system of treatment because they have not the courage to offend the prejudices, or oppose the caprices of some self-willed, wealthy, and, perhaps, influential person. We must oppose the spread of quackery, and endeavour to prevent the harm resulting from it, by increased devotion to our profession, by prosecuting researches for the discovery of new truths, or for confirming facts which appear inconclusive, and by unremitting efforts to demonstrate simply and most conclusively the soundness of the fundamental principles of medicine. The skill of the modern chemist exposes the vicious refinements of the most ingenious and subtle poisoner; and in the same way our earnestness and gradually increasing knowledge of disease must ultimately destroy the influence which unscrupulous charlatans have long exerted upon ignorant persons." (pp. 6-7.)

Next follows a brief exposition of "the cell and other theories," premised by the admitted proposition, "*all living structures spring from pre-existing living structures.*" Again, all living structures are perpetually undergoing change; they grow, are nourished, exist for a time, and ultimately die. They possess the power of assimilating to themselves lifeless matter, and communicating to it the same peculiar properties with which they themselves are endowed; and, further, they possess the power of multiplying themselves infinitely, of giving rise to other organisms which inherit similar properties to those which their progenitors possessed. The exact method in which all these changes are accomplished has been the object of the various theories referred to.

The accepted theory of cell origin, viz.—that cells are produced from pre-existing cells by division—is too familiar to the readers of this journal for it to be necessary to enter into any details concerning it; while the theory of aggregation advanced by Schleiden and Schwann having, with the exception of Dr. Bennett, of Edinburgh, few advocates among eminent physiologists, we need not stop to discuss it here.

The theory propounded by Wolf, as recently modified by Huxley, is briefly described :—

“This theory supposes that the organism at the earliest period of its existence consists of a clear semi-fluid material. Soon certain changes occur in this; spaces or vacuoles which have the appearance of cells are formed. In these again, nuclei appear. The growth and multiplication of these spaces is effected by changes in the surrounding substance—by the surrounding material *growing* in towards its centre, and separating the vacuole, cell or space, into two parts.” (p. 10.)

According to Beale, the chief difference between these two theories is that in the former the cell is the active part, while in the latter it is the *intercellular substance* which is active.

Beale says that in the organism it is certainly true that there are structures composed of bodies resembling cells; but contends that there are also tissues whose origin from mere cells it is not easy to make out.

“In fibrous fasciæ, tendons, and ligaments, for example, we have a tissue containing here and there nuclei; but it is impossible to demonstrate in it at any period of its existence bodies which might be fairly termed cells. In the structures which apparently correspond to cells in some tissues, there is no cell-wall, hence they have been termed *nuclei*, while it is believed that the material, the fibrous tissue in which they lie, is formed altogether independently of these.” (p. 10.)

So in the case of many other tissues; without enumerating any, however, he contends it is difficult to conceive how the cells were formed, and to explain how, by any changes occurring in the form of such cells, existing structures could be produced; and that while the formation of some tissues is therefore intelligibly explained, by the cell and other theories, there are others to which their application is exceedingly unsatisfactory, and entirely inadequate to account for existing appearances. While admitting this statement of Beale—especially in the application of the cellular theory to the so-called intercellular substances as illustrated by the hyaline intercellular substance of pure cartilage, to explain the formation of which, it is totally inadequate—it is but justice to Virchow to state that the modification of his views with regard to the essential character of the cell wall, *does* admit the application of his theory to the formation of a larger number of tissues.

The nature of this modification is given by a correspondent from Berlin to the *Edinburgh Med. Journal* for February, 1865, in which the writer states that “Virchow personally expressed to him that he *now* did not regard a cell wall as an essential part of the cell as given in cellular pathology; but that a nucleus surrounded by a molecular blastema was sufficient to constitute a cell; that the outer part of this cell blastema consolidates and forms a cell wall, as Beale has shown, and that this takes place in the amœba when thrown into fresh water.” It will only be necessary for the reader to remember these statements when we come to develop the theory of Beale, to be convinced that the gap between the two theories is very much diminished by their admission.

The better to appreciate his own observations, and the train of reasoning based upon them, Dr. Beale asks us to dismiss, for the time being, all theories, and consider with him the changes actually seen to take place in the growth of various organisms, when examined under the most favourable circumstances, under the highest powers of the microscope.

Taking a little of a deposit of phosphate of lime as an example of inorganic matter, and placing it under the microscope, we find it presenting the appearance of a "number of minute granules possessing no form or structure whatever." Magnified by the highest powers you will indeed increase the size of the particles and bring others into view, but still there is no appearance of *structure*. Certain oscillatory movements are also observed among these particles, the so-called *molecular* movements first described by Mr. Robt. Brown. These particles being inorganic, the movements can be the result of physical forces alone.

Next he supposes a small fragment of dead animal or vegetable matter to be placed in a few drops of water on a glass slide and under the microscope. The water appears clear as the slide upon which it rests. Next place both these slides under the same conditions for a few hours, allowing free access of light and air. Then examining each again, the one containing the inorganic deposit of phosphate will be unchanged, except perhaps so far as an aggregation of some of the particles may have taken place. The second slide in which the organic material was mounted, before perfectly clear, now contains an additional number of minute granules, closely resembling those of the phosphate of lime, and manifesting similar molecular movements, suspended on either slide by the addition of a little gum, glycerine, or other viscid material, and recurring on dilution with water; indicating that in both cases these movements are due to physical causes.

Again, let both slides be set aside for a few hours, then re-examined, when we shall find the slide containing the inorganic matter still unchanged. But not so with the slide containing organic material. "The granules have increased considerably in number. Many have become altered, or their place is occupied by little bodies, some of which have a circular, others an elongated form, but all exhibit a remarkably simple structure." On the elapse of more time the change still continues. "The little bodies have become larger; in fact, they have grown, and have, moreover, considerably increased in number. It is easy to make out in the largest particles that *the central portion differs from the exterior*; in fact that each is composed of at least two substances, or a substance in two different states." Further examination of one of these will show these substances to consist externally of a delicate membrane, and within of a material having a granular appearance. These changes, it will be remembered, have taken place only in the organic or living particles placed under conditions favourable to the development of simple living organisms, and at a certain period the granules on the two slides could scarcely be distinguished, and they have been derived, not spontaneously, but from pre-existing living beings, in accordance with the law stated early in the lecture. And the compositions of these structural particles corresponds exactly with the compositions of the elementary parts of the higher animals. The external investment is the *formed material* of Beale; the granular material within is his *germinal matter*.

In further illustration of the structure of the simplest living organisms, Dr. Beale supposes the microscopic examination of a little ordinary mildew, the elementary parts of which are larger than those we have been

examining. It will be observed to consist of a number of little round bodies, each having a *tolerably thick, well-defined outline*, while the *interior presents numerous small particles like dots*—the *two parts*, one externally, transparent, arranged to form an investing membrane, closed at all points, the other within, granular, and presenting no form. In these bodies, too, under favourable circumstances, certain changes will occur. Placed upon the moist surface of a glass slide and allowed to remain for a time, they first absorb moisture and swell up, and the membrane appears thinner than before, while the granules have increased in number. Second, “a new change is observed; at one point in the membrane a small orifice is formed, through which a little of the granular contents of the body covered with a thin layer of the inner part of the membrane passes, and thus a small nodule is formed which projects from the external surface of the membrane.” This increasing in size gradually assumes a structure like that of the parent body; the membrane around it becomes thicker, and the attachment less, until complete separation takes place; when it becomes “an independent organism exactly resembling that from which it sprung, and capable of giving rise to new individuals like itself by a repetition of the process by which it was formed.”

Other similar methods of multiplication of particles are admitted by Dr. Beale. In these an orifice forms on the membrane of the particle of mildew, and a little of the granular material escapes, but it does not separate as in the first case; it remains in connection with the mass, and grows out into a narrow thread-like process. The membrane on the external surface becomes thickened, and the whole increases in breadth. Within are contained a number of little spherical bodies or spores, like those observed within the circular body from which the process has grown. It may be that as this process grows, at one or more points a thinning occurs in its wall, and a portion of its contents coming into more immediate contact with the pabulum increases in amount, and thus gives rise to the production of another process or processes growing from and exactly similar to the first.”

We have been thus particular in detailing the method of multiplication of living particles as given by Beale, because it is one of the points in which his theory differs somewhat, but not totally, from the “cellular theory” as held by Virchow. They evidently coincide as regards the source of the new body—always from a pre-existing organism; but while the cellular theory multiplies by duplication and reduplication of the original cell or elementary part, that of Beale makes the process more nearly allied to gemmiparous reproduction, by a budding from the original parent.

In both, the active agent is the whole or a part of the substance within the membranous investment, the cell contents and nucleus, according to the cellular theory, the *germinal matter* of Beale; while the membranous investment, the cell wall of Virchow, *formed material* of Beale, is passive. The *germinal matter*, descended from germs, is constantly producing germs. The *formed material*, inert, is formed from the *germinal matter*; hence the term applied by Beale.

It is the property of the germinal matter removed from any organism recently alive to be stained by an ammoniacal solution of carmine with glycerine, while the formed material is not thus stained; or if it be stained, owing to too great strength of the solution used, the stain is removed by soaking in glycerine, while the stain of germinal matter is rendered permanent by preservation in glycerine.

Thus a very convenient aid to study results from this property, without which it would be impossible, in every instance, to distinguish the matter which corresponds to the substance within from the external envelope of the mildew. "Every *elementary part*," which is the term Dr. Beale prefers to substitute for the ordinary word cell, "of every living organism may be considered to consist of matter in these two different states: *Germinal matter*, which, from inanimate nutrient material, will produce new germinal matter, and which becomes converted into *formed material*; and this latter substance which was once in the state of germinal matter."

The so-called *nuclei* and *nucleoli* of cells, which are stained of a deeper red by carmine than the surrounding germinal matter, Beale considers simply as new points of germinal matter, just converted from inanimate nutrient material, which passes in from without and becomes incorporated with the living granular substance by conversion into it. The new matter is not produced by deposition upon the external surface of the investing membrane, but is produced through the agency of the germinal matter in the interior. Were the former the case, the external membrane would become thicker and thicker as the growth advanced, while the central portion would remain unaltered; whereas, we find that as growth proceeds, the wall in most cases becomes considerably thinned.

The external membrane or formed material is in every instance the oldest portions of the elementary part, and the inner surface of the membrane is younger than the exterior. The formed matter of which the membrane covering the mass is composed was once granular germinal matter, and resembled that in the interior; but the particles composing it have passed through various stages of existence, and now no longer possess those wonderful properties which belonged to them at an early period of life—the power of communicating vital properties to inanimate matter. It is passive; dead.

The second lecture is devoted to further illustration of the theory and its application to the higher animal tissues.

"The organism is made up of different tissues, and these tissues are composed of *elementary parts*. Each elementary part consists of *germinal matter* and *formed material*, which was once in the state of germinal matter and formed from it." (p. 26.)

The first application is made to *cuticle*, of which the oldest portions are known to be on the outside, and the most recently formed nearest the blood, the source of their nutriment. Microscopically, the different characters of different parts are readily noticed. That nearest the vessels consists of small masses of germinal matter closely approximated. Nearer the surface the masses have a more definite arrangement, each consisting of an oval body with an external membrane. Still nearer the surface the elementary particles appear more or less flattened, and a larger quantity of formed material (cell wall) is present, while at the surface the elementary parts present hardly any indications of germinal matter, and seem entirely composed of cuticular substance (formed material).

This is the history of the growth of cuticle according to our author:—

"Here is a little mass of germinal matter, which grows and thus divides into two, each of these subdivide, and so on. Now each of these little bodies absorbs nutriment from the surrounding fluid. It increases in size. The older particles on its surface are altered and appear to be converted into a hard substance which is improperly described as membrane (cell wall). As it approaches the surface of the body the hard material becomes thicker and thicker, forming

the cuticular substance, until at length the germinal matter in the centre having nearly all undergone conversion into formed material, and being too far removed from the source of supply to increase at the same rate, the remainder perishes; by this time the elementary part in the form of the flattened scale of cuticle has reached the surface of the body, and is to be removed." (p. 28.)

Tendon, as the type of another class of tissues, is next selected for the application of the theory. Composed principally of so-called white fibrous tissue, under a power of two hundred diameters, a portion of foetal tendon is seen to be made up of oval masses of germinal matter, with a certain proportion of intervening fibrous structure. Earlier in its existence it contained a larger proportion of germinal matter, and if its growth be watched, the fibrous material will be found to increase, while the germinal matter relatively diminishes, until in the adult tendon there is principally fibrous material, the germinal matter being present in very small quantity. This fibrous material is the formed matter which has undergone conversion from the germinal matter, which at this period is situated at regular intervals throughout the tissue, having the appearance of nuclei, and corresponding to the connective tissue corpuscles of the cellular theory. It is through these masses that the inanimate nutrient material is converted into fibrous matter. At the outer part of each is a layer of soft tissue in a transition state. It has ceased to be germinal matter, and is about to become tendon.

The application of the theory to the development of nerve fibre, as attempting to elucidate a subject of some obscurity, is interesting. The difficulty of the investigations is admitted, and it is only in the terminal distribution of the nerve fibres that the structure of the elementary part is to be made out. These fibres, as distributed to the elementary fibre of voluntary muscle, contain numerous oval masses of germinal matter, situated at short distances from each other, along the course of the fibre :—

"In an early stage of the growth of the fibre the masses of germinal matter are very close together, but as the growth of the fibre proceeds, the distance between the oval masses is increased. The germinal matter probably forms new tissue at either of its extremities, so that as the quantity of formed material is increased, the masses of germinal matter are farther and farther removed from each other. Hence, an elementary part of nerve fibre may be represented as an oval portion of germinal matter with an exceedingly delicate fibre projecting from each side of it." (p. 31.)

The third lecture is occupied principally with the consideration of the changes occurring in elementary parts, resulting from altered conditions of growth, and illustrated by the phenomena of the blister and formation of pus. To which are added some remarks on white blood-corpuscles and pus-corpuscles, and the process of secretion.

The lecture is opened by an apt illustration in a comparison of the process of crystallization, with the formation of living structures, according to the author's theory, which needs but to be referred to, to be appreciated at once. The two processes, instead of being similar are directly opposite, the former being the result of external deposition, while the latter occurs by internal deposit.

The changes occurring in elementary parts resulting from the change of the conditions under which they grow, are the causes of the different forms and properties of the various structures of the body, as well as of the changes which are the result of disease. The surface of the skin, for example, is perfectly smooth and even in health, because a balance of the

two opposite processes of *removal* and *repair* is maintained. We have already seen that in cuticle there is a constant addition of new particles at its deep aspect, and these gradually pass towards the surface, increasing in size as they pass outwards, while the old particles on the outer surface are constantly being removed. So long as these two processes keep pace with each other, the normal condition of the skin is maintained. But suppose the skin, supplied with improper pabulum, or not supplied at all, a deviation from the balance results; old matter is removed from the surface, but nothing new may be produced to supply its place. Such a change occurs in scarlet fever:—

“The morbid matter circulating in the blood interferes with production of new cuticle: for a time none is formed, but by and by when the violence of the disease abates, and the poison is in a great measure eliminated from the blood, the formative process is re-established. A gap, however, exists, as it were, between the tissue formed before the interference of the disease, and that produced after the natural process was resumed. In point of age they are separated by an interval, so that as the new cuticle grows up from below, the old is separated *en masse*. We may suppose that some change of this sort occurs in those creatures which, at regular periods, shed their skins.” (p. 42.)

So the formation of tissues having peculiar properties depends upon the powers of the germinal matter. All tissues are formed from germinal matter, and though germinal matter presents everywhere the same appearance, it possesses different properties in different situations. Thus, the germinal matter of cartilage produces cartilage wherever placed, that of bone forms bone wherever transplanted; in illustration of which we have the well-known fact that though bone itself be entirely removed, if the germinal matter capable of producing it is allowed to remain, new bone will be produced. Hence the surgeon desires to leave the periosteum intact in the excision of diseased bones, that new healthy bone may be produced. Certain morbid actions illustrate the same truth, one of which is the so-called “bone cancer.” Certain minute particles, the germs of the growth, pass into the blood, and are carried by that fluid to different parts of the body; so minute, that they pass through the smallest lymphatics and capillaries; so great their vital properties, that when arrested in any part of the circulation and deposited in any tissue they take root, grow, and give rise to a structure resembling that from which they have been derived. So are maintained the peculiar properties of muscle, nerves and of secreting organs.

The process of secretion is illustrated by that of the liver. Though the ordinary diagrammatic representations of the liver cell make it a well defined round or oval body, containing a nucleus, in reality no such regularly formed body exists, while some of the cells have a very irregular outline, often angular, and sometimes ragged. Nor can the constant existence of a cell-wall around the so-called liver-cell be demonstrated. Hence the cell-wall is not a necessary part of the cell, and Dr. Beale prefers to speak of it rather as an elementary part, consisting of a mass of formed material and germinal matter.

“The germinal matter (nucleus) contains separate centres of growth, smaller masses of germinal matter (nucleoli) growing and appropriating to themselves new material, and capable of becoming a structure like the whole mass, so that all might be destroyed, except the nuclei and nucleoli, and these, retaining their vitality, would commence to grow anew.” (p. 50.)

The mode of secretion of bile he thus explains:—

“The material from which the bile is to be formed transudes from the blood-

vessels; it is absorbed into the interior of the mass constituting the 'liver-cell.' Here it is converted into the material of which the germinal matter is composed. The particles of this mass are constantly growing from centre to circumference, and when they have reached the circumference of the mass, having passed through various stages of existence, they become bile. So that in secretion the same rule is observed that we noticed in the growth of tissues. The conversion of new material begins at the centre, germinal matter is the form which it first assumes, and the particles of this substance towards the end of life give rise to particular tissues, or, in the process of secretion, to the peculiar substance which is resolved into the constituents of the secretion." (p. 50.)

I have been thus particular to give the author's precise words, that no misconception of his meaning can, if possible, arise. The easy applicabilities of this theory to other secretions, as the milk and urine, will, of course, be perceived.

According to Beale, the *white corpuscles* of the blood, *pus-corpuscles*, *corpuscles of the lymph and chyle*, and *the contents of the closed glands* are to be regarded as masses of germinal matter possessing the powers of growth. Hence their resemblance, though their powers are very different. The white corpuscles are prevented from undergoing any process of development into tissue by the constant motion to which they are subjected. If stationary from any cause, they give rise to the formation of a simple kind of fibrous tissue—"indeed, there is reason for believing that *fibrin is the formed material of the white blood corpuscles*." So when lymphatic glands are enlarged and the quantity of fibrous tissue increased, Beale believes that the fibres in the substance of the gland are formed from lymph corpuscles. The peculiar tail-like appendages of many white corpuscles in the spleen, familiar to all microscopists, he believes to be the result of initiatory steps in the formation of fibrous tissue—they are formed material converted from germinal matter.

The formation of pus is illustrated by the phenomena of the blister. When an ordinary blister is applied, the skin swells, fluid is poured out beneath the surface of the cuticle, between the two layers, and the superficial layer is pushed up. If the deep surface of this layer be examined it will be found to consist of a number of elementary parts, each having a thick outer wall, with a central portion of germinal matter very distinct. In the subjacent fluid, too, a number of such particles will be found floating separately. If the irritation be kept up some time, we obtain, as is well known, a viscid fluid holding in solution a vast number of bodies composed almost entirely of germinal matter, and having a very thin investment of formed material, growing and multiplying rapidly. *These bodies are pus-corpuscles:—*

"The effect of the irritation is such that the elementary parts of the cuticle are produced with greater rapidity than in the normal state. Nutritive material is supplied from the blood, and in greater abundance than usual, and this must be converted into living material. * *

The nutritive material, then, is converted into germinal matter in the ordinary way, but so rapidly do subsequent changes occur that there is no time for the gradual production of cuticle. The elementary parts of cuticle are formed by a process of slow and gradual transformation of germinal matter as it grows old, into cuticular substance; but in the morbid state produced by the irritation of the blister, this gradual transformation cannot take place, and elementary parts consisting almost entirely of germinal matter, with very little formed material, are alone produced. Flakes of very soft spongy structure resembling cuticle are first formed, and these give place to the development of the substance we know as pus. In the process of healing, the order of the change is reversed.

The formation and multiplication of germinal matter gradually diminishes, and time is allowed for the proper cuticular material to be formed." (pp. 45-6.)

A sufficient number of examples have now been drawn from the different structures of the body to illustrate the formation of tissues from germinal matter, so that the remaining lectures, principally devoted to the development of individual tissues in detail, will be passed over in more rapid review. A few words only with regard to the *embryo*, which Beale considers as consisting "almost entirely of germinal matter, the separate masses of which divide and subdivide until the basis of each tissue is laid down. Then the oldest particles of the germinal matter of each mass become converted into the particular substance of which the tissue is to consist." We could wish this subject of the human ovum to have been more fully discussed. No reference is made to the germinal vesicle and spot of the egg, their origin, or the part they perform in the development of the embryo. The whole subject would be more complete had the egg been made the typical elementary part, if such it is considered, and the theory further illustrated by reference to it, as it is made the typical cell in the theory of Virchow.

The fourth lecture is occupied with a consideration of the ultimate microscopic constituents of tissues, with a view to a correct and uniform terminology which should be observed in writing and speaking of microscopic appearances, a matter of very great importance, as much misinterpretation of views has been the result of a careless use of terms. These are *granules* or *molecules*, *globules*, *fibres*, *perfectly clear, transparent, and structureless membrane*, *nuclei*, *nucleoli*, and *cells* or *elementary parts*.

The first is the *granule* or *molecule*, defined by Beale to be "a particle which is too small to exhibit any form or structure when examined by the highest magnifying powers we possess. It appears as a very minute *dot* or *point*." Granules may be simple or compound, organic or inorganic, living or dead. *Living particles*, under favourable circumstances, *grow*, not by aggregation, but each individual particle increases in size by absorbing matter which surrounds it, and causing a complete alteration in the properties of this matter. Living granular matter can always be positively distinguished from inanimate granular matter by the ammoniacal solution of carmine, which stains the former, but leaves the latter uncoloured. The living particles tend to separate or divide, in obedience to a power resident in living matter which compels the particles to move in a direction *from the centre*, where the matter of which they are composed became living. The *inanimate granular* matter may be albuminous, fatty, or saline, albuminous being dissolved by acetic acid or alkali, fatty by ether, and saline by water, acids, or alkalies, according to the nature of the substance.

A *globule* is defined to be "a body which appears under the microscope circular, with a dark outline and transparent centre." They are generally spherical, but may be oval or irregular, and vary much in size. They, too, may be albuminous, fatty, or mineral, but the term is only properly applied to bodies of the above character of like composition throughout. The same tests indicate their composition. The thickness of the outline of a globule depends upon the difference between the refractive power of the matter of the globule itself and that of the medium in which it is immersed. The greater the difference the thicker the outline.

A *fibre* is defined as "anything which appears as a mere line, or solid and thread-like with a double outline." A fibre thick in the centre, and gradually tapering into thin lines at the two extremities, is called a "fibre-

cell." Any tissue exhibiting lines parallel to each other, and exhibiting regularity, or arranged irregularly, crossing and interlacing in various directions, is said to exhibit a "fibrous appearance." This may be due to mode of formation, or produced artificially in some perfectly clear substances by the addition of chemical reagents.

Transparent membranes are not defined by Beale, most probably because the term membrane conveys to the minds of all moderately informed readers what it is intended to indicate. Yet there is an evident incompleteness in the paragraph, in consequence of the absence of definitions, whereas each of the other microscopic elements is defined. There is manifest difficulty in defining accurately a term so commonly used, and yet the various applications of the term would seem to call for a definition.

Examples of structureless membranes are often seen in the so-called "cell-wall," and the walls of capillary vessels. Appearances of a transparent membrane may also be produced artificially by the application of chemical reagents.

The remaining elements, *nuclei*, *nucleoli*, and *cells* or *elementary parts*, form definite masses which possess vital endowments, are therefore characteristic of living beings, and present a definite structure.

Our author defines a *cell* or *elementary part* to be "a structure always consisting of matter in two states—*forming* and *formed*, or *germinal matter* and *formed material*. The first or active substance is surrounded and protected by the outer passive matter, through which all pabulum to be converted into germinal matter must pass."

It will be remembered that the ordinary definition of a cell is that it is a perfectly closed sac having certain contents, among which is essentially a nucleus, but that, in accordance with the modified views of Virchow, who is looked upon as the exponent of the cellular theory, it does not materially differ from the cell or elementary part as defined by Beale.

"*Nuclei* and *nucleoli* are new centres which are developed in pre-existing living matter." Mere oil-globules should not be mistaken for nucleoli. Nuclei and nucleoli, as already stated, are always darkly coloured by carmine, while oil-globules do not receive the colour at all.

The fifth lecture is devoted to the anatomy and properties of *tissues*, of which Beale attempts no specific classification, because of the apparent impossibility of suggesting at present a classification which would assist the student. The usual classification—into, 1. Cell tissues; 2. Connective tissues; 3. Contractile tissues; 4. Nervous tissue—is given.

The so-called *soft connective tissue* is referred to as that soft silky fibrous structure serving as a connective medium between other tissues, and to support higher structures;—the *firm*, as illustrated by white fibrous tissue, and *hard connective tissue*, as seen in bone and dentine. Beale desires to show that the distinction commonly thought to exist in all these tissues, of *cells* and an intercellular substance, does not actually exist, and that the so-called "intercellular substance" has not an independent origin, but corresponds to "the wall" or "formed material" of an "epithelial cell." And here appears to us the strength of Beale's theory, contrasting favourably with the weak point of the cellular theory, so called; for it is in accounting for the intercellular substance of the connective tissues that the cellular theory is strikingly inadequate, while that of Beale explains most satisfactorily its presence.

The anatomy of tendon is first described, his specimens being made, not in the usual method, from desiccated tendon, but from moist tissue,

thus obviating any changes which may be produced by drying and re-moistening.

The relation of the formed material (white fibres) to the germinal matter (connective tissue corpuscles) was given in illustration of the theory in review of lecture I.

Beale considers the "canalicular system" of stellate cells and communicating tubes for conveyance of nutrient juices, as demonstrated by Virchow, to be dependent upon an alteration produced in the nuclei or masses of germinal matter, and upon the displacement and tearing of some of the young tissue connected with them; these the result of pressure and other necessary violence in making sections and other manipulations. "In the dead tissue they may be called tubes, but they are *artificial tubes*, and do not convey nutrient juices during the life of the tissue."

So with regard to the delicate fibres of yellow elastic tissue encircling the bundles of the white fibrous tissue of tendon, which Virchow considers tubular, and forming a part of this nutrient system, Beale has again and again failed to demonstrate any such tubular character.

It is well known that perfect white fibrous tissue is rendered transparent by acetic acid, and that yellow elastic tissue resists its action. Yet not all fibres which resist the action of acetic acid are yellow elastic tissue. The imperfectly formed fibrous tissue (nuclear fibres), or that portion of the formed material immediately joining the germinal matter, and which is not, therefore, perfectly-formed "formed material," also resists the action of acetic acid. This fact has caused observers to conclude that nuclear fibres are elastic tissue, which is erroneous. And it must be remembered that nuclei generally resist the action of acetic acid, and we use this reagent so much in anatomical investigations because it possesses the property of rendering fully formed tissue transparent, and thus the nucleus or germinal matter, and recently formed matter around it, become much more distinct.

Again, though white fibrous tissue, or all intercellular substance, is thus acted upon by acetic acid, it does not follow that this intercellular substance is produced in the same manner, possesses the same chemical or physical characters, and performs the same offices, in whatever organism or whatever part of an organism it may be found. True elastic tissue, such as is found in the ligamentum nuchæ, ligamenta subilava, chordæ vocales, &c., is always connected with and developed from nuclei; but there are many fibres ordinarily considered yellow elastic fibres, as the fine fibres encircling the bundles of fibrous tissue of tendon, and the nuclear fibres alluded to, which are not true elastic tissue. The first, according to Beale, are probably the remains of vessels or altered nerve-fibres, while the latter are recently produced formed material.

The *cornea* is treated of at this point as a modification of white fibrous tissue. Beale considers the so-called connective tissue corpuscles of the cornea, which are considered by Kölliker and Virchow cells for the distribution of nutrient material, simple masses of germinal matter, continuous with the fibrous tissue, and directly concerned in its formation.

The consideration of the fibrous tissues is continued in the sixth lecture. In the mucous tissue of the umbilical cord, where Virchow maintains the existence of special nutrient channels which anastomose with each other, and thus form a system of communicating tubes for the conveyance of nutrient materials, Beale fails to discover anything like such an arrangement. According to Beale, this mucous tissue of the umbilical cord

... "consists merely of a soft form of connective tissue, in which the fibres correspond exactly to the fibrous tissue of ordinary tendon. The interspaces between the finest of the fibres seem to be occupied with soft transparent granular matter.

"The fibres, with the numerous nuclei, are for the most part arranged to form the boundaries of more or less circular spaces. In the spaces are seen more delicate fibres, arranged without much regularity, and the nuclei are much less numerous in the central part of the space than they are amongst the fibres which bound it. As the tissue grows, the formation of new fibres takes place at the circumference. The nuclei of the older fibres die, and a great part of the fibrous matter itself is gradually softened and disintegrated; so that the circular spaces are gradually increasing in diameter as the tissue advances in age.

"An elementary part of this tissue consists of an oval mass of germinal matter, with ragged fibres projecting from either extremity, and often extending for some distance. Many of the elementary parts are triangular, and the fibres pass off in three directions. The fibres have the general appearance of ordinary connective tissue, and the germinal matter extends for some distance in opposite directions, gradually tapering into a very thin line, which is at length lost among the fibrous tissue. In the fresh tissues, therefore, there are no communicating tubes and lacunæ, as Virchow has described. What appears to be a space or cavity in the centre of the elementary part, is really occupied with germinal matter, and the apparent tubes contain prolongations from this imperfectly formed soft fibrous tissue. This soft germinal matter breaks down very soon after death, and thus spaces and tubes may result. These tubes do not exist as channels in the tissue during life, and the nutrient matter *permeates every part of the tissue, instead of flowing through any special channels.*" (pp. 91-2.)

We have thus quoted, almost entire, the remarks of Beale on this subject, because, as he remarks, Virchow regards this structure as one which especially favours his own view, and conclusions formed must necessarily influence our views upon the process of nutrition generally.

The *vitreous humour* is considered by Beale as a form of very delicate fibrous tissue, the fibres of which are combined with a very large quantity of water. Upon the inner surface of the hyaloid membrane, which is continuous with the vitreous humour, round masses of germinal matter exist, which are separated from each other by pretty regular intervals, and from them a very soft tissue can be traced into the vitreous, with which it is in fact continuous. To these so called cells the vitreous humour bears the relation of formed material to germinal matter in other situations.

According to this view, the oldest part of the vitreous humour is in the centre, while the circumferential parts are last formed, though Beale thinks it probable that this structure during life undergoes very slow changes indeed.

The seventh lecture is devoted to *adipose tissue* and *cartilage*.

Adipose tissue is generally associated with areolar tissue, and the fat vesicles lie in the spaces which exist in the areolar tissue. *Marrow* is a very pure form of adipose tissue.

The fat-cell, or vesicle, is the "elementary part" of adipose tissue. The fatty matter in adipose tissue is always situated within a very thin membrane, which is indeed a good example of a cell wall, though the young fat-cell has neither fat nor cell wall. The fat is formed and deposited in the substance of the granular material of which the fat-cell in its early stage is composed. The deposition of the fatty matter may be compared to the deposition of starch and some other deposits which Beale calls "secondary deposits," found after a certain period of growth, has been reached in some vegetable cells. But the fatty matter is not

only deposited from a solution, but it is *formed*, and may be produced, though no fatty matter is taken with the food.

"At an early period of development, we observe a number of oval or spherical masses of germinal matter (nuclei) in those positions where fat is to appear. These divide and subdivide as in the development of other tissues. The collection is freely supplied with capillary vessels. If the tissue be stained with carmine, each mass is coloured darkly in the central portion (nucleus), and external to this there is a layer of granular matter only faintly coloured. The latter gradually increases, and amongst the granules, a number of small oil-globules make their appearance, or only one is to be seen. * * The fat gradually increases, and soon occupies the greater part of the 'fat-cell,' which now consists of a large globule or several small globules of fatty matter, and a thin layer of granular matter around this, which is much thicker in one spot than elsewhere, and there the original nucleus is situated. The granular matter undergoes condensation at its outer part, and becomes the clear transparent cell-wall, or vesicle, and in the fully-formed fat-cell, the nucleus will be situated between the fat and the wall of the cell. As long as the nucleus or mass of germinal matter remains the fat may go on accumulating in the interior." (pp. 107-8.)

This fat Beale considers to be formed by a conversion of the granular or germinal matter of the elementary part. In this way also are produced the deposits of fat in liver-cells and the so called cartilage-cells.

With regard to cartilage, the greatest difference of opinion exists as to its essential structure and mode of formation. It is generally supposed that cartilage consists of *cells* and *intercellular substance*, and many contend that each cartilage cell possesses a very thin wall or capsule distinct from the cartilage matrix. By others, among whom is Virchow, it is considered that the soft granular matter just within the cell wall corresponds to the primordial utricle of plants. Beale contends that the cell wall cannot always be demonstrated as distinct from the matrix, which is sometimes absent, sometimes contains fibres resembling yellow elastic tissue, and in fibro-cartilage resembles white fibrous tissue. According to Beale, in the development of cartilages—

"The masses of germinal matter at first are very close together; they divide and subdivide as they lie in the soft formed material, and, as development proceeds, become separated from each other by gradually increasing intervals. At the same time, the formed material undergoes slow condensation, and the formation of new material on the surface of each mass of germinal matter more than compensates for the shrinking of the matrix, which would otherwise be manifest. Each of these masses of germinal matter divides and subdivides, and formed material is produced on the outer surface of each, so that there are small collections of masses of germinal matter separated from each other by a considerable extent of formed material in the shape of fully-formed cartilage, while the separate masses composing each collection are themselves separated from each other by a very thin layer of recently produced and much softer formed material." (p. 113.)

According to our author, then, the matrix of cartilage is simply the formed material of the germinal matter constituting the so-called "cartilage cells," and corresponds with the cell wall or membranous capsule, of which the primordial utricle or inner membrane is only a younger portion.

This is evidently different from the teaching of Virchow, according to whom the membranous wall of the capsule *sends in septa* when the cells it contains undergo division, which serve as new envelopes for the young cells, yet in such a way that even the gigantic groups of cells which proceed from each of the original cells are still inclosed in the greatly enlarged parent capsules.

The eighth lecture is devoted to *bone*, which has been carefully investigated, but in which much still remains undetermined.

In bone the *formed material* is impregnated with calcareous matter, in such manner as to produce a very hard, unyielding tissue, which, however, possesses a certain amount of elasticity. The observations of most histologists are based upon the examination of *dried bone*, whereas they should be based upon the examination of *living or recently dead bone*. To this former method, Beale thinks may be attributed the difficulty of giving to the student a correct notion of the structure of bone and teeth. According to Beale—

“An elementary part of *fully-formed bone* consists of a mass of germinal matter, surrounded on all sides by, and continuous with, a thin layer of soft formed material, which passes uninterruptedly into the hard calcified formed material (matrix or intercellular substance of authors). This hard material is penetrated everywhere by very fine channels (canaliculi) through which the nutrient material passes towards the masses of germinal matter. An elementary part of bone at an *early period* of formation consists of a mass of germinal matter, surrounded by a certain proportion of granular homogeneous or more or less fibrous formed material. This last becomes the seat of deposition of calcareous matter, which proceeds from *without inwards*, and the *formation of the canaliculi takes place in the same direction*. * * An elementary part of fully formed *dead and dried bone* ‘consists of a space (lacuna) occupied in the recent state with germinal matter. Numerous pores or channels (canaliculi) pass from one lacuna to adjacent lacunæ.’ In the dry bone lacunæ and canaliculi are both occupied with air, and in consequence of the great difference in refractive powers between the air and the bone tissue, the cavity and tubes appear black.” (pp. 123-4.)

The *canaliculi*, according to Beale, are not processes of a cell, but *altered spaces* which are left between the calcareous globules originally deposited, and through them pass fluids to and from the germinal matter. The portion of the canaliculus first formed is that which is *most distant from the lacuna* and its contents.

“No stellate corpuscle has been produced, but the stellate appearance results from the circumstances that the calcareous matter has been deposited in the matrix in such a manner as to leave intervals arranged in a more or less stellate manner.” (p. 132.)

As to the contents of the canaliculi, in *dead dry bone* they contain nothing but air; in *young bone* they are filled with nutrient matter.

“The bony tissue with its canaliculi and germinal matter, always has a certain definite relation to the vessels. It may exist as a simple thin lamina, covered upon each side with a highly vascular membrane, or as solid cylindrical processes often arranged so as to form a network, also invested with a vascular membrane; or the osseous tissue may be arranged in concentric laminae around a central canal (Haversian canal), which in the living bone is occupied by a capillary vessel, around which are numerous *fine granular cells*. These cells are concerned in the removal of the osseous tissue. * * * Of a thin plate of bone the tissue in the centre is the oldest. Of a solid cylinder, that in the centre was first formed, while of the laminae of the Haversian system, those at the circumference are oldest, and the laminae close to the central vessel were the last developed. The first two forms of bony tissue, constitute the cancellated structure, and the last (Haversian systems) make up the compact tissue of bone; but transitional forms exist.” (pp. 133-4.)

The so-called *myeloid cells* are soft masses, having the appearance of large compound cells, composed of the elementary parts (“cells”) of bone. At an early period of development, they consist only of several small oval masses of germinal matter, the outer part of which is undergoing conversion into formed material. This increases, becomes impreg-

nated with calcareous matter, forms the little plates or cylindrical spiculæ of bone which enter into the formation of the cancelli. These myeloid cells are found beneath the periosteum as well as in the medullary cavity; and in disease, the soft spongy tissue which is formed in connection with the bone, consists of masses of this kind.

The *periosteum*, usually described as a fibrous membrane, in its outer layers exhibits a simply fibrous structure, but in its deeper portion are seen a number of elementary parts of unossified bony tissue, each consisting of an oval mass of germinal matter surrounded by a granular looking formed material. This deeper layer is the seat of the formation not only of new bone, but of complete Haversian systems.

The *medullary* membrane is a highly vascular membrane resembling periosteum, but more delicate and contains less fibrous tissue.

The medulla, or marrow of bone, is a form of adipose tissue existing in the cancelli, the medullary cavity, and even in the Haversian canals. They probably originate from the proper marrow cells (myeloid cells), which may become converted into bone tissue or marrow, some becoming the former and others the latter.

Development of Bone.—In mammalia, bone begins to form at an early period of intra-uterine life: 1st, by ossification of fibrous membrane; 2d, by ossification of temporary cartilage—most of the bones of vertebrata being represented in the first instance by cartilage.

The writer's view of the processes of *caries* and *necrosis*, processes important in a practical point of view, and yet imperfectly understood in so far as minute changes are involved, must absorb a moment's attention in this already too protracted review. In *caries*, as in the development of bone, the removal of old Haversian systems and the formation of new ones, in the union of fractured ends of bones and in the formation of bone cancer, "cells," or rather masses of germinal matter, are the active agents.

In *caries*, as in rickets, cancer, and ordinary suppuration, the vital changes going on are too active.

"Increase is proceeding too fast, for the condensation of the tissue to take place. Here, as in all other cases, rapid change is associated with brief duration, while the well-developed normal lasting tissue is formed very slowly, and the changes succeed each other in the most gradual, orderly, and regular manner."

"In *caries*, the germinal matter of a part of a bone receives too large a supply of nutrient matter, it grows too fast, and lives upon the surrounding tissue which has been already formed." (p. 145.)

In *necrosis*, the death of the germinal matter of many lacunæ takes place. "This results when the supply of blood from any cause is cut off." The passage of blood through the vessels being interfered with, the germinal matter of all that portion of bone receiving nutriment from them must die, and a piece of bone of a considerable size be "necrosed."

Beale explains the formation of the new bone around the sequestrum by supposing that around this the nutrient matter would flow more freely though less regularly; in consequence of which the germinal matter of the neighboring lacunæ would grow much faster, and finally surround the dead bone. This, in turn, ossifies and the dead bone becomes surrounded by irregularly formed new bone. This Beale believes to take place, not in consequence of any irritation by the presence of dead bone, in consequence of which the cells are *excited to increased action*, but simply as the result of a more free access of nutrient matter. He says, "the so-called 'irritant,' instead of 'exciting,' acts in the most passive manner possible, it allows pabulum to have freer access to the living or germi-

nal matter. It removes, to some extent, the restrictions under which growth normally takes place." (p. 147.)

The ninth lecture, which is a long one, is devoted to the *teeth*, the changes in which Dr. Beale thinks receive a most satisfactory explanation upon the new views propounded by him. Here, too, authors have committed the same errors as in regard to bone, by describing the anatomy of dead and dried tooth structure. The dental tissues, of all textures of the body, undergo the least amount of change.

The structures of human teeth are three: 1. Dentine or tooth bone; 2, enamel; 3, cementum or *crusta petrosa*. The second is the hardest, the first next, and the third the softest; though at an early period all were equally soft, the hardness being due to the deposition of calcareous salts.

The papilla existing, the dentine is formed upon the pulp, but not out of it, and grows constantly in one direction only, from without inwards, and therefore, when the extreme circumference is once formed, it is not possible that the tooth can increase in diameter by dentine, since dentine is never normally formed upon its outer surface. These processes continue, and the tooth gradually increases in depth by the formation of the fang which projects downwards towards the socket which is being formed for its reception. As already intimated, the dentine is not formed from the pulp, but from a *nucleated columnar* epithelium placed at right angles to the surface of the pulp. As new dentine is formed upon the peripheral portions of these cells, the latter encroach upon the pulp, the constituent tissues of which diminish in amount.

The so-called *dental tubes* of a *living tooth* are never empty; indeed, they are not tubes, nor are they canals for the transmission of nutrient substances dissolved in fluid, but they contain a soft solid substance, a portion of which near to the pulp is in a state of active vitality, and which is a prolongation from one of the columnar cells referred to. This corresponds with the *germinal matter* of Beale, while the wall of the tube, with the matter between the tubes corresponds to his *formed material*.

"The elongated masses of germinal matter first of all produce *formed material*, which gradually increases as in other cases, upon the outer surfaces of the germinal matter. The formed material of the adjacent elementary parts is continuous, and calcareous matter is first deposited in the oldest part of this formed material. The calcareous matter appears in the form of globules, which gradually increase in size and often coalesce." (p. 156.)

The *enamel rods* are likewise formed from elongated cells which become calcified. These are situated entirely beneath a thin membrane to the under portion of which the most superficial portion or summit of these cells adheres. This membrane is highly vascular, and Dr. Beale has succeeded in making beautiful injections of it in the canine tooth of a pig three months old. The calcareous matter is first deposited in that part of the cell nearest the dentine which was first formed, and is deposited in small columnar masses in successive layers, which are indicated by transverse layers in the fully formed enamel rods. The enamel cell increases in length, and the so-called nucleus moves away in a direction from the dentine as the increase takes place.

The *cementum* is not true osseous tissue. The lacunæ are often larger and more irregularly arranged, the matrix of the cementum is more transparent and harder, and much consists of a very clear transparent structure of a refractive power and hardness much resembling dentine, with small tubes traversing it here and there, but irregularly arranged. Again, the

lacunæ are less numerous than in bone, the canaliculi are often of great length, and cementum is formed much more slowly than bone. Cementum is not formed by ossification of the tooth sac. It is continuous with dentine, and dentinal tubes may often be traced into its structure.

"If the fang of an adult tooth, properly prepared, be examined, a very beautiful soft tissue will be found upon the surface. This takes part in the formation of the cementum, and is concerned in the formation of those exostoses which often grow upon the fangs of the teeth. It is composed entirely of what may be described as branching cells (elementary parts), the processes of which anastomose freely with each other. It is from this tissue that the crusta petrosa (cementum) is formed. It is a most perfect example of a tissue consisting entirely of cells, the cavities of which *communicate with each other by tubes*. The stellate cells are here as distinct as they are in the pith of the rush." (p. 164.)

But they do not, according to Beale, as according to Virchow, constitute an elaborate system of channels for the distribution of nutrient material to the tissue intervening between them. This tissue, growing very slowly, requires little nutrient matter, and the means are far more elaborate than would be expected.

According to Beale's view, these processes are not tubes in the living tooth. During life they contain a solid or semi-solid substance corresponding to that which occupies the so called dentinal tubes. It is *germinal matter* which is undergoing conversion into *formed material*, and the situations in which these so-called tubes existed are the last portions of the formed material to undergo calcification. Many of the stellate masses also disappear during calcification, while the number of processes or tubes projecting from those remaining is increased from ten or twelve to as many as thirty or forty. Hence Beale infers that these tubes are not an early stage of canaliculi, and the cells cannot become lacunæ simply by deposition of calcareous matter in the intervening matrix or intercellular substance. Still calcification takes place, and he also says, many processes become narrower and disappear, as do also many of the stellate masses themselves. This would seem to imply a diminution of the number of processes, which, as already stated, are increased, according to our author. This point is unexplained by him, and can only be accounted for by supposing that although some processes disappear, yet many others remain whose cells have disappeared, and thus the relative proportion of processes to lacunæ is increased. It must be admitted that there is a want of clearness in this section. In summary, Beale says, "the tooth is not developed from a papilla consisting of a sub-basement tissue, but it is formed in the very centre of a collection of cells, and it is clear that these cells have been formed in the central part of a pre-existing mass." According to Beale, enamel and dentine are an *epithelial structure* in the same sense that a hair or the cells in a glandular follicle are regarded as epithelial. This is in opposition to Huxley, according to whom they are *not epidermic* but *dermic*.

With regard to the so-called *membrana præformativa* or *basement membrane*, concerning which there is so much dispute, Beale contends that it is by no means constant, and considers it "*certain* that no præformativa membrane has been actually demonstrated *over* the enamel, as Huxley asserts, *between* the enamel and dentine, as many observers hold, or *beneath* the dentine." But supposing the basement membrane to be a necessary anatomical structure, he admits that the *proper position* would be *between the epidermis of the skin and the modified connective tissue of which the body*

of a cutaneous papilla is composed. Yet he considers that such a membrane has no more to do with the *formation* of structure beneath it than the capsule of the seed with the formation of the seed itself.

The tenth lecture is on *life*, a part of his subject which our author considers himself incompetent to consider, but feels called upon to make some reference to the nature of life.

In the present course he has attempted to show that

"All discussions with reference to vital actions must be restricted to the consideration of the changes which take place in the particles of germinal matter only, for here the inanimate matter certainly becomes living, and after retaining for a time the active power of animating new matter, the particles most distant from the centre where they become living lose all vital power, and become resolved into various substances, which, there can be no doubt, are again under the influence of physical and chemical laws." (p. 200.)

These changes Beale attributes to the influence of a peculiar power which may be called *vital power*, and feels compelled to accept an hypothesis, inconclusive though it be, until a reasonable explanation of the phenomena is afforded. We are enabled to investigate matter before it becomes living, and through organic chemistry we have learned much of chemical compounds produced when germinal matter becomes formed material, and when formed material is disintegrated. So we know something of the compounds resulting from sudden or slow death of germinal matter; but we *know nothing* of the relations existing between the different elements which constitute a particle of *living germinal matter*.

"Between the time that the inanimate pabulum becomes living and the time that the living matter becomes formed material, there is an interval in which the matter exists in a very peculiar and exceptional state. *This is the living state—a state which is to be distinguished from every other state in which matter is known to exist*—a state not determined or caused by external circumstances, not capable of being communicated to matter through space, nor of being excited in matter by any known agents or combinations of circumstances—a state which may cease to be manifested at any moment, but which, as far as is known, cannot be caused to commence anew. Now, those who have discussed the nature of vital forces have not alluded to this temporary state. They have restricted themselves to the consideration of the matter before it assumed this living state, and after it had passed through it." (pp. 201-2.)

Beale thinks *living matter* of the different beings of creation always exhibits the same general characters, that the granules or spherules forming the germinal matter are made up of spherules ad infinitum—that the intervals between them are occupied by smaller ones separated from each other by fluid containing in solution, 1st, matter about to become living; 2d, substances not capable of being animated; and 3d, in many cases substances resulting from changes ensuing in particles arrived at the end of existence. He believes that all these spherules are free to move, and that the movements always take place in the same direction, *from* the centre at which the particles become living—*centrifugally*. These points of sphericity and centrifugal movement of the ultimate particles of germinal matter are much insisted upon throughout the lectures.

Our author admits that there is no evidence to show how these elements are related to each other, that the changes which occur cannot be explained by physical and chemical laws, and thinks it probable that the ordinary physical and chemical forces are in abeyance:—

"It seems as if there existed at this time a power in obedience to which the

matter became affected in a manner we cannot explain. It is this power which we understand as the life. It is in obedience to this power that the living particles move *from* centres instead of gravitating *towards* centres, like the particles of ordinary matter." (p. 204.)

We fear that from this, as from other speculations upon the same subject, we obtain only inadequate ideas of the true nature of life, and as we are compelled to fall back upon an inscrutable Omnipotence as the source of life, so also we must be content to leave with such Omnipotence alone a knowledge of its true nature.

The remainder of the lecture is devoted to a brief consideration of *vital movements* as simply illustrated in contractility, the movements of the amæba, white blood cells, mucus-corpuscles, &c., as to the cause of which we can only say, *it is LIFE; to the chemical constitution of living matters*, of which we are ignorant, because chemical laws in this condition are in abeyance, and it is impossible to analyze matter in the living state; and to the *physical theory of life*. To this latter several pages are devoted. It is very properly denied that the formation of living tissue is the result of physical and chemical changes *alone*, that physical force is vital force. To convince the mind of this it is only necessary carefully to examine the phenomena of a single cell where vital actions are sufficiently distinct. But in these days there is little prospect of this—"the formation and destruction of faunas and floras, asteroids and worlds, suns, and systems, absorb the attention."

Beale objects to the employment, in speaking of lifeless bodies, of terms formerly exclusively applied to changes occurring in living things. Thus "the willow-leaf, like bodies in the photosphere of the sun at a temperature sufficient to convert many metals into vapor, are '*organisms*' which '*develop*' and '*elaborate*' heat and light from the bosom of a new luminous fluid (Sir J. F. W. Herschel, *Good Words*, 1863, p. 282)." So "Dr. Tyndall speaks of a watch as a '*little creature*' which shows '*signs of animation*,' and is '*restored to life*' by the application of its key!" Such terms, he admits, are employed metaphorically, but they are open to much misconception.

At the same time, while denying the identity of vital and physical force, Dr. Beale admits that many of the phenomena now generally considered to make up the life of a fully formed organism, are physical phenomena, but contends "how very much there remains nevertheless to be explained!" The error of the physiciest lies in this that he does not inquire how the matters decomposed were *produced*. Dr. Beale has been accused of materialistic views. We must confess there appears, in our conception, nothing in the little volume before us which can justify such accusation.

As has already been intimated, we fear that this review has been too prolonged. We have abstained from criticism, have quoted rather than commented, in consistency with our object early stated, to give to the American profession an opportunity of becoming familiar with the views of Professor Beale, of making such practical applications of them as possible, and of confirming or refuting them as may appear most consistent with the dictates of their own reason.

J. T.

BIBLIOGRAPHICAL NOTICES.

ART. XV.—*Transactions of American State Medical Societies*.—

1. *Transactions of the Twenty-First Annual Meeting of the Ohio State Medical Society, held at Ohio White Sulphur Springs, July 19, 20, and 21, 1866.* 8vo. pp. 173.
2. *Transactions of the Medical Society of the State of Pennsylvania, at its Seventeenth Annual Session, held at Wilkesbarre, June, 1866.* Fourth Series—Part II. 8vo. pp. 152.

1. *The Transactions of the Ohio State Society* opens with an address by B. S. BROWN, M. D., the retiring President, which contains many very sensible remarks, though nothing of a very novel character. A brief sketch is given of the onward march of our profession in the road of discovery and improvement—its duties to itself and the community at large—and the imperfections, many of which are perhaps irremediable, which still cling to it. Some of the opinions of Dr. B. are very loosely expressed, and there are some, the correctness of which may be called in question.

A very good report on "*Military Surgery*" is presented by Dr. NORMAN GAY. It treats of the different plans of amputation and of *resections*, their applicability and favourable results.

The report on Obstetrics, by THADDEUS A. REAMY, M. D., of Zanesville, presents a concise history of the advance of obstetrics from a mere trade to the dignity and exactness of a science. Some very good remarks are offered on the management of abortion—destitute, however, of any decided originality. Criminal abortion occupies a large portion of the report. The reporter, in considering the subject, is particularly outspoken. The practice is unquestionably on the increase in every portion of our country, especially in the large cities; not only in the unmarried female to conceal the shame of an "illegitimate bird," but in the married also, who are willing to consent to the murder of their unborn offspring to escape the trouble, expense, and responsibility of rearing them after their birth. It is in vain to attempt to put a stop to the practice of abortion until the public shall be duly convinced of the demoralizing effects of its practice by married females as a matter of mere convenience.

A very severe, and not altogether undeserved, criticism of Dr. Hildreth's paper on rupturing the membranes, artificially dilating the os, with the use of ergot and chloroform, as a means of shortening tedious labour is presented. There are cases and periods of labour in which rupture of the membranes will shorten labour; but their too early or inopportune rupture, especially when followed by the forcible dilatation of the os uteri, and the administration of ergot, is liable to produce serious injury to child and mother, as is pointed out in the report.

The reporter approves of the application of instruments to shorten labour in certain cases, when there is neither a contracted pelvis nor other impediment to delivery. The practice is liable, however, to lead to a serious abuse of instruments which would render us loth to recommend it. Speaking of the use of chloroform in midwifery, the reporter remarks, that in severe obstetric manipulations and operations he would prefer giving the anæsthetic by inhalation; but under all the other circumstances in which its administration may be desirable, he advises it to be given by the mouth. When mixed with milk he has seldom known it to produce nausea or vomiting.

In cases of prolapse of the funis the plan of placing the woman on her elbows and knees, so as to make an inclined plane on the anterior surface of the uterus, is commended. The reporter employed it in six cases of prolapsed cord. In four of which he succeeded without difficulty in returning the cord, and thus

saving the children. In the other two the head was low down, and the cord already much compressed. All efforts at replacement were ineffectual, and both children were lost.

The reports are followed by an interesting paper on the "*Therapeutics of Zymotic Diseases*," by Dr. E. B. STEVENS, of Cincinnati. On the subject of the remedial efficacy of the saline sulphates in the diseases usually ranked under the head of zymotic, Dr. S. remarks: At present we simply summon the large array of respectable and credible witnesses to prove results; and certainly until now the weight of testimony inclines in favour of the value of this class of remedies in that extended group of diseases. Whether the explanation of their beneficial results will bear a strict analytical examination remains to be proved.

In our own opinion, the great mistake in the doctrine which suggests the prescription of sulphites in the zymoses is, *first*, in the supposition that they are uniformly applicable to all cases of blood poisoning; and, *second*, that they arrest a *process of fermentation*, in the same way they do in ferments exterior to the body. In cases where they exert a curative effect we doubt not it will prove to be just in the same way that quinia and arsenic do in ague; that is, by supplying necessary principles to the blood, and aiding the process of elimination; and they in addition exert a third influence in reference to the morbid poison producing the disease, as is exhibited in the antagonism of certain poisons—opium and belladonna, alcohol and the virus of the snake.

Dr. W. C. HALL, of Fayetteville, Ohio, relates a case in which a wire hair-pin had been introduced by a female into her urethra for the purpose of thus relieving an intolerable pruritus vulva, and which had escaped thence into the bladder, where it had remained nine months, giving rise to troublesome symptoms. It was finally removed with some effort by means of an extemporized hook and the fingers of the operator. The pin, in its bent form, was four inches long; it was no ways altered, except being covered for more than half its length by calcareous matter, and in its other portion somewhat eaten away by rust. It seemed to have become imbedded in, or at least adherent to, the wall of the bladder. Very little blood escaped during or after the operation. An anodyne was given, and the patient passed a pretty comfortable night. For some days there was incontinence of urine. She soon, however, began to improve, and in one month was up, and in two she was able to visit her friends.

A report on the "*Influence of Public School Instruction on Health*" was made by R. M. DENIG, M. D., of Columbus. The reporter confines himself to an investigation of the influence upon health of the system pursued in numerous schools, public and private, of requiring daily of the pupils many hours of continued mental application in the study and recitation of various branches of learning totally unconnected with each other, and this with no, or a very short, allowance of time for exercise and recreation.

I consider it entirely unnecessary we quote the sentiments, if not the precise words, of that portion of the report furnished by Dr. J. C. Reeve), to adduce to a body of practical physicians illustrations of the fact that an overstrain of the mental powers in youth weakens them and produces disease. As physiologists, we know that no growing organ can bear excessive labour, and the brain least of all. As pathologists, we know that to this cause is traceable, with frightful frequency, the broken-down mental constitutions of middle age, the act of suicide, and many of the sad wrecks found in our lunatic asylums. The public mind needs instruction on this subject, and in fulfilling our avocations as physicians, having ever in view the fact that the highest aim of our calling is to prevent disease, we must supply this instruction. Especially should we urge the important fact that much injury may be inflicted in youth, the effects of which will not be felt until a later period of life. The bad seed sown in the school-house may only bear fruit in after years. It may be long in ripening, but ripen it most certainly will.

The concluding report is "*On the Number and Condition of the Incurable Insane*" in the different counties of the State of Ohio. The number of these unfortunates throughout the State are reported as about 240, the treatment of a majority of whom is anything other than what we would believe would be tolerated in the midst of a professedly enlightened, religious, and humane com-

munity. It is surprising to us that the condition of the irrecoverably insane has not been earlier pointed out, and, by their legitimate advocates, the physicians of Ohio, measures taken to place them in appropriate asylums, where their physical wants may be properly attended to.

2. *The Transactions of the Seventeenth Annual Session of the Medical Society of the State of Pennsylvania* comprise but few county reports, most of which are particularly barren of interest, presenting only loosely stated general facts in reference to the leading diseases which prevailed during the twelve months preceding the session in the different counties or sections of the State. Even the facts embraced in the reports are but little adapted to enlarge our acquaintance with the etiology of the prevalent diseases in different seasons and localities, from a neglect on the part of the reporters to compare them with the medical topography of the places where, or the meteorological phenomena which preceded or attended their appearance. The report from Alleghany, it is true, is preceded by a very full and satisfactory outline of the topography, geology, hydrography, meteorology, etc., of the State, illustrated by a very good map. A slight sketch of a similar character precedes, also, the report from Lycoming County.

From a careful perusal of all the reports contained in the volume before us, we should infer that the general characteristic of the past year, throughout nearly the entire State, was heavy rains, succeeded, late in the summer, by a drought of some continuance, a very variable temperature of the atmosphere, the average being decidedly mild.

The session was opened by an address from the president, Dr. William Anderson, the leading theme of which was the mission of the physician and the essential requisites for its successful fulfilment.

In the report from Alleghany County, we are informed that a rain which continued with a constancy unusual to that climate, commenced on the 10th of June, 1865, and continued, with intermissions of only a day or two, until the 11th of the ensuing August, without any marked reduction of temperature. Speaking especially of the city of Pittsburg, the report states that during this long wet spell, the atmosphere became so surcharged with moisture that articles deposited in closets, etc., soon became thickly covered with a blue mould, and instruments rusted in their cases. Much personal discomfort arose from the arrest of the natural cutaneous transpiration, the body being constantly bathed with a profuse moisture. Most persons complained of an engorgement of the air-passages; some experiencing severe dyspnoea, others a profuse catarrh. Nettle rash of a persistent and severe form prevailed among both old and young; it did not appear to be influenced by diet, nor any of its ordinary causes.

Whilst in the city of Pittsburg the streets and alleys were almost daily drenched with rain, the number of sick was greatly reduced, and the mortality diminished in a corresponding degree. Several cases of intermittent fever, a disease seldom met with in the vicinity of Pittsburg, were encountered during this wet season; they were of the quotidian type.

During the year 1865 very few deaths occurred from scarlet fever, smallpox, measles, or hooping-cough. Only twenty-six deaths from all the four diseases were reported in the city of Pittsburg.

During the early months of the year, and in summer, a few cases of typhoid fever, of a rather unusually fatal character, were met with, and on the 20th of November a large number were suddenly attacked with the disease. It was almost entirely confined to the city. Though many of the cases were severe, the attacks were in general, though distinct in character, of an extreme mildness. The deaths reported for the whole year were only sixty, while it was estimated that during the last quarter of the year there occurred no less than twelve hundred cases of the disease. The comparatively filthy nature of a locality was, we are told, a pretty sure and constant index of the severity of the fever.

In the commencement of the attack there was, in all cases, a well-marked remittent type, with a decided remission, which almost always occurred about four o'clock P.M. After the third or fourth day, however, the intermittent character entirely disappeared, and the symptoms which are considered as

pathognomonic of typhoid fever uniformly occurred. The *tache rouge* could always be discovered about the seventh day. There was seldom any complication of disease of chest or bowels. In a few cases convalescence took place on the tenth day, but more generally not until the eighteenth; several, however, continued for five or six weeks, recovering with great difficulty, without any decided period of convalescence. The recovery was nearly always satisfactory; there were few instances of relapse. Slight attacks, particularly when attended with inactivity of bowels, were in several cases succeeded, after some weeks, by a troublesome diarrhoea, which came on suddenly.

When typhoid fever appeared in Pittsburg, the city was deluged "with reeking, noisome filth." The reporter believes that the damp nights of autumn, with the hot sun shining during the day upon this accumulation of compost, had much to do in developing the disease. Dr. T. J. Gallagher refers its direct cause to the water in daily use. It is obtained from the Alleghany River, through a supply pipe laid in the body of the stream at a point where much refuse and offal from the upper part of the city are encountered.

Dr. Semple reports that during sixteen years' practice in Wilkesburg, Alleghany County, and its immediate vicinity, he had never met with a single case of intermittent fever originating in that locality until September, 1865, between which period and the end of November he treated seventeen cases, three occurring in Wilkesburg and fourteen on the banks of the Alleghany, three miles distant. Eleven cases were of the quotidian type, and six of the tertian. All yielded readily to full doses of quinia. There were no noticeable sequelae.

In the report from Berks County, typhoid fever is noticed as having prevailed in 1865 to some considerable extent, in a district some ten miles northeast of Reading; here, during the fall and winter months, some forty cases occurred. The pathognomonic symptoms of the fever were well marked. The bowels were the organs chiefly implicated—there were no cases attended with thoracic disease. Some facts are adduced to prove the contagious character of the fever; they are far, however, from being conclusive. No especial exciting or predisposing cause of the endemic was noticeable. The soil is gravel, bordering on limestone. The inhabitants are farmers and mechanics, and in the main frugal, industrious, and temperate.

In the report from Bradford County it is remarked that the character of the fevers which occur has within the last few years undergone a material change. Formerly they were purely typhoid, but now they are typho-malarial. But few terminate fatally.

Dr. Cole states that, as early as May, he met with a low form of bilious-remittent fever, and that since scarcely a day passes without the occurrence of new cases of the disease. Dr. C. treated sixty-five cases of the disease during the year. It attacks persons of all ages, and of both sexes, and pays no regard to season or location. In about half the cases the fever ran its course in about twenty-one days, the other half in from ten to nineteen days. In many instances it ran through entire families.

The symptoms were yellow or jaundiced appearance of skin and eyes, headache, pain of back and limbs, lassitude, loss of appetite, tongue thickly coated, sickness of stomach, in many cases vomiting and diarrhoea. Upon the subsidence of the fever, symptoms of great exhaustion are apt to ensue; the tongue becoming covered with a dark hair-like fungus; in one instance it appeared to be half an inch in length, and remained some time after convalescence had set in.

Malarial diseases, either remittent or intermittent, prevailed during the entire winter in different parts of Bradford County, and of unusual severity. They usually begin with chills, a sense of weakness, with trembling, slight pains of head, neck, back, and lower limbs, loss of appetite, occasionally nausea. This forming stage may continue from three to seven days, with little or no fever. When fever sets in, in the great majority of cases it is marked by intermissions or well-marked remissions and exacerbations; the type being quotidian or double tertian, rarely quartan. When neglected or improperly treated the fever soon assumes the continued form, with hot, dry skin, *color mordax*, brown or black tongue, more or less coma, and at night considerable delirium. If not relieved,

the symptoms increase in severity, and death may take place in from three to five weeks from the commencement of the attack. Constipation is more frequently present than diarrhoea. Cough, with much expectoration, was generally present, as was also congestion of brain and lungs. Gastritis or gastro-enteritis, either with or without disease of the muco-glandular structure of the bowels, was seldom if ever present. The most effectual treatment, we are told, was that usually pursued in periodical fevers. There was an unusually luxuriant vegetation during the summer of 1865, with frequent, copious rains, and this, it is suggested, was probably the chief cause of the severity of the fevers observed.

In the same report Dr. Mason remarks: "Fever, of miasmatic origin, has been with us constantly. During the year '65, fifty per cent. of all the sickness has been fever. It assumed a variety of types. Many cases presented the usual symptoms of "simple bilious fever," while in other cases it was difficult to distinguish it from true enteric fever; again, there was, sometimes, an apparent blending of the symptoms of both bilious and typhoid fever, while again the case would present all the features of a case of pure typhoid, and run a course of from fifteen to twenty days, and then change its type to that of a tertian or quotidian ague, and this in the depth of winter. These fevers have been named by some typho-malarial. Some of them appear to be neither, being, apparently, cases of simple continued fever, without any disease of the muco-glandular bodies of the intestines. The cases were mostly mild, but generally lasted from eight to thirty-six days. The simplest treatment, we are told, succeeded the best in the treatment of these fevers."

Typhoid fever prevailed also in portions of Bucks County.

In the report from Indiana County, it is stated that of late years the fevers of that section have been mainly of the typhoid or intermittent form. To places along the larger watercourses intermittent fever is endemic. The malarial cause is often to be recognized, also, in the continued form of fever. In some localities it is a rare thing to meet with a clear case of intermittent or of typho-malarial fever. But in the southern portion of the county pure malarial disease is not unfrequent. What has been termed by some of our physicians *typho-malarial fever* is new, we are told, in Indiana County. The writer of the report from the county remarks that he presumes it would be called by many remittent; but upon a close and careful analysis some very striking differences are to be noticed. At the onset of the disease the symptoms very much resemble those of typhus, of a somewhat mild form. They are headache, chilliness, loss of appetite, white coating of tongue, bronchial cough, scanty and high coloured urine, laxity of bowels. When the chill and sweating stage are passed, the skin becomes hot and dry, the headache increases, together with all the other symptoms. Having reached their maximum, a remission sets in, usually once in twenty-four hours, after which the same train of symptoms are repeated. Epistaxis occurs about the end of the second week from the full establishment of the disease. The pulse is usually full, but not frequent, seldom exceeding ninety per minute, compressible, never bounding; varying little until the disease begins to abate, when it becomes slower, softer, and fuller. The steadiness of the pulse is remarkable even when the cerebral symptoms are the most distressing. No eruption has been detected upon the skin. Thirst is not excessive; no vomiting; little intestinal difficulty; bowels open about every twelve hours. When the crisis has been reached, great muscular prostration ensues, with low muttering delirium, which lasts from five to eight days, with picking of the bed-clothes, and all the signs of exhaustion met with generally in the continued form of fever.

In the report from Lycoming County, Dr. Crawford records no prevalence of epidemic disease, but a more general prevalence of the endemic diseases of the valley; all of them partaking more or less of a malarial type. All the cases of fever that came under his notice were of the so-called "typho-malarial" character, and when not broken up in the first stage by antiperiodics, ran a protracted course, but generally terminated favourably.

In the report from Perry County it is stated that there was, apparently, a greater tendency to intermittent fever than usual, and an unusual tendency also

in many diseases to assume a periodical form. Along the watercourses, as usual, remittents and intermittents prevailed, but to no very great extent.

The tendency in other diseases to assume an intermittent type was more manifest at points remote from the rivers than in their immediate vicinity. In some instances the intermittent feature was very persistent, requiring more than usual care on the part of the patient to prevent the occurrence of relapses.

Typhoid fever and diseases of a typhoid type were rarely met with, and when they did occur were mild in character.

In the report from Schuylkill County, Dr. G. W. Brown remarks that, on the approach of autumn, bilious intermitting and remitting fevers became very prevalent, much more so than for the previous twenty years. Some of the cases were highly inflammatory, others assumed a typhoid form, while others, again, were attended by severe neuralgic symptoms. The population is largely made up of boatmen, many of whom, with their families, live during the summer, in their boats, travelling between the county and New York. Among this portion of the population, towards fall, cases of intermittent fever are annually met with. In the autumn of 1865, however, the disease was very prevalent among the permanent residents. At the commencement and close of the year typhoid fever occurred to some extent. Fatal cases, which were few in number, were usually attended with profuse hemorrhage from the bowels. Dr. Carpenter, of Pottsville, notes the prevalence of typhoid fever, thirteen cases of which fell under his care. Four of these were *typho-malarial*, and originated from drinking the water of a well so replete with decaying vegetable matter as to be unpleasant to the sense of smell. Several of the cases occurred in soldiers who had been imprisoned in the pens at Andersonville and Florence.

Two cases of congestive fever were met with. In one death took place notwithstanding quinia, in large doses, was given at the second paroxysm. This occurred in a patient prostrated by chronic diarrhoea contracted in the army.

In the report from Susquehanna County, it is stated that some cases of typhoid, remittent, and intermittent fevers occurred, but presenting in their character and course nothing especially worthy of note.

In the report from Westmoreland County, Dr. McCaughy, of Madison, states that typhoid fever did not prevail epidemically in 1865. He had about twenty sporadic cases to attend, one of which was in a returned soldier. He was recovering from the disease when discharged. Upon exposure to cold and wet, he had a relapse, of which in a few days he died with symptoms of perforation of the bowels.

According to Dr. Stevenson, of Adamsburg, typhoid fever prevailed during the first three and last four months of 1865.

Of *spotted fever*, or cerebro-spinal meningitis, mention is made in only five of the reports—those from Lehigh, Northampton, Schuylkill, Susquehanna, and Westmoreland. In none of the sections referred to does it appear to have prevailed to any great extent.

Of *scarlet fever* the same remark may be made. It is noticed in the reports from Bucks, Lycoming, Northampton, and Schuylkill.

Measles is noticed as "having prevailed," in the reports from Bucks and Lycoming.

Erysipelas seems to have been met with quite frequently in Berks, Bucks, Lycoming, and Schuylkill. In the first mentioned county it was mostly traumatic; in the last both traumatic and idiopathic.

Smallpox occurred to a slight extent and in a very mild form in the counties of Alleghany, Bradford, Perry, and Schuylkill.

We have culled from the several reports comprised in the Transactions before us whatever facts they contain in relation to the fevers prevalent in the different sections of the State of Pennsylvania from which those reports emanate; and have presented them in one continuous view. If the facts referred to have no further value, they at least give a very interesting though, it is true, a somewhat imperfect exhibit of the forms and character of the fevers recently prevailing in different portions of our State.

In addition to the fevers and the usual sporadic, more properly, perhaps, climatic, diseases, the reports in the volume before us refer to the occurrence in

several of the counties of *diarrhœa*. In Bradford it is said to have been of a very severe form; of *dysentery*, constituting in some localities a somewhat formidable endemic; of *diphtheria*, which, however, prevailed, it appears, to no great extent in any of the sections of country heard from; of *jaundice*, which, in Bradford, is said to have been particularly frequent and severe. An extraordinary prevalence of *neuralgia* is noticed in the report from Bradford, while the prevalence of *pertussis*, never, however, to any great extent, is referred to in the reports from Bradford, Indiana, Lehigh, Lycoming, and Schuylkill.

There has prevailed, apparently to a very great extent, throughout our State, a peculiar cutaneous eruption popularly termed the "army or soldier's itch," to determine the true character and nature of which has greatly puzzled physicians. The following remarks on this affection, contained in the report from Northampton County, accord with the views we have formed of its nature, based on the study of the cases which have fallen under our own notice. "The cases reported under the name of 'army itch,' it is evident, cannot be referred to *scabies*, as they have not yielded to the treatment pursued so successfully in that disease. It is, also, evident that different diseases have been classed under the same name, for the treatment has varied too much, and the same remedies have too often failed in different hands, for us to believe that the different practitioners have had the same disease under treatment. Besides the cases which have occurred with us have seldom spread from the sick to the well. It has frequently occurred that an individual affected with a troublesome disease of the skin, attended with a most intolerable itching, has slept with another without the latter contracting the disease; such cases have invariably resisted the treatment by sulphur. Some of these are cases of *eczema*, others of *prurigo*. It may be questioned whether the cases which yield readily to the sulphur treatment, internally or externally, or to the solution of sulphur and lime, are not true cases of *scabies*. We are not aware that any of these cutaneous affections were more prevalent among soldiers than among those who had never been in the army. It is very well known that the same diseases were quite as common before the war as since its close. We cannot avoid the conclusion that the term 'army itch' is a misnomer, and that we shall not arrive at a course of treatment that can be relied upon in the several species of cutaneous disease that have been confounded under that name, until they shall be more clearly distinguished."

A report made to the Alleghany County Medical Society, by Dr. A. I. DAVIS, of East Liberty, gives an account of "an abnormal pregnancy of *forty-nine* years' duration." The subject of this abnormal pregnancy had been married four years, when, being in her thirty-second year, she became pregnant for the first time. Her period of gestation was marked by nothing unusual. At the proper period, labour appeared to come on, but after the occurrence of a few pains, it ceased entirely. The prominence of the abdomen remained, as if caused by a tumour in one of the iliac regions, and so continued up to the period of her death, forty-nine years subsequently. It produced scarcely any inconvenience save that in micturition the urine was passed slowly, and with occasional interruptions in its flow. The lady died November 1, 1851, in the eighty-first year of her age. At her request, a post-mortem examination of her body was made. There was found in the abdomen a fœtus encased in a closely-fitting osseous-like envelope, having the appearance of a hard ovoid tumour, six inches long and fifteen at its greatest circumference; the walls being about one-third of an inch in thickness. The fœtus itself was a female, fully developed in all its parts, with a full crop of hair. When handled it had an indurated or leather-like feel. Its appearance was not unlike that of a fœtus that had been long preserved in alcohol.

D. F. C.

ART. XVI.—*Reports of American Hospitals for the Insane:—*

1. *Of the State Asylum, New York, for the year 1865.*
2. *Of the King's Co. (N. Y.) Asylum, for the fiscal year 1865-66.*
3. *Of the Retreat, at Hartford, Conn., for the fiscal year 1865-66.*
4. *Of the Butler Hospital, for the year 1865.*
5. *Of the State Asylum, New Hampshire, for the fiscal year 1865-66.*

1. *THE State Lunatic Asylum, at Utica, N. Y.,* as is shown by the report for 1865, has "become overcrowded. * * * The highest number of patients at any time during the year was 616; the lowest 557; and the daily average 591. This gives a household of about seven hundred people."

	Men.	Women.	Total.
Patients at the beginning of the year,	283	281	564
Admitted in course of the year,	184	172	356
Whole number,	467	453	920
Discharged, including deaths,	158	147	305
Remaining at the end of the year,	309	306	615
Of the discharged, there were cured,	60	53	113
Died,	27	30	57

Deaths from phthisis pulmonalis, 23; general paresis (*paralysie générale*), 14; exhaustion from mental disease, 4; apoplexy, 3; paralysis, 4; meningitis and cerebritis, 2; epilepsy, 5; old age and exhaustion, 1; perforating ulcer of the stomach, 1.

"Twelve men and two women died of general paresis. Whether this fatal disease is more prominent than formerly, or whether the increased number sent to the Asylum each year, results from the fact that professional men recognize the disease more generally and send them to our care, I will not here discuss. My conviction is that it is on the increase. In twenty-two cases of paresis received during the past year, not a single case had been previously recognized by the attending physician, and for that reason committed to our charge. In fact, few medical books speak of the disease, and cases of it are not reported in ordinary standard medical works.

"Few women, according to our observation, suffer from this disease. The two who died of paresis, the present year, were well-marked cases, exhibiting all the ordinary physical and mental symptoms."

The whole number of cases of this peculiar and interesting, though exceedingly fatal form of mental disorder, which have been admitted since the beginning of the year 1849, is, men 102, women 8; total 110. Of these, 89 men and 7 women have died. Nothing is said of cures, or of the whereabouts of the remaining fourteen. The report contains a brief history, with the post-mortem pathological conditions, of several cases.

Dr. Gray's report is replete with interesting matter, a large part of which is statistical, and consequently the result of much labour. His exposition of the medical treatment pursued at the hospital is, in our opinion, the most valuable portion to the general medical reader, and we therefore extract it nearly in full, although its length transcends our usual limits.

"In cases of acute mania as a means of calming excitement and inducing sleep we use tinct. hyoscyamus, and tinct. ext. cannabis Indica, either singly or combined, in doses of 1 or 2 drachms, twice or three times daily. In some cases one or two drachms nightly, secures the desired effect. When there is full habit and strong pulse, the most satisfactory results are sometimes obtained by combining with one of these tinct. digitalis. When there is much nervous agitation and restlessness from an enfeebled condition of the nervous system, we have found great benefit from the use of tinct. valer. comp. and ammoniated fluid extract of valerian, both in soothing and calming the agitation and in inducing sleep. If there is marked cerebral anæmia, we resort to stimulants, such as brandy punch, egg nogg, whiskey punch, wine and morphia, in combination with tinct. hyos. or cannabis Ind. When morphia is not tolerated, we endeavour to secure the stimulating effect of opium by the use of Squibb's aqueous solu-

tion, which is often well borne when other preparations are not. In all feeble cases we endeavour to secure the horizontal posture, at least several hours in twenty-four, and in cases of marked prostration much more, in order to secure a full circulation of the blood to the head and spinal column, and thus nourish the great nervous centres. In many cases of acute mania with great exhaustion, horizontal posture for days and weeks has, we are well persuaded, been the means of saving the patient's life, when medication and nutrition alone would have failed, and in other cases it has prevented the patient from sinking into dementia. In enfeebled states, in all diseases, the vital importance of maintaining a horizontal posture is recognized, and in cerebral anæmia, a condition so often present in insanity it is the vital indication. * * *

"In melancholia, constipation is commonly present, not as a cause, but dependent generally on torpor of the bowels, peristaltic action, in some cases seeming almost suspended—a condition probably arising from defective reflex action and blunted sensibility of the peripheric sentient nerves. * *

"If habits of regularity can be enforced, and the attention of the patient directed from his condition, much has been attained. * * *

"In the decoction of *rhamnus frangula*, however, we have found the most available remedy, alone or combined with small doses of *podophyllum*. The *rhamnus* has also this quality. Its effect is not decreased by long continuance; but, on the contrary, it may be gradually diminished in doses, and may be given for a long time without losing its effect, and with permanent relief. It is also a good stomachic, and in these respects differs from ordinary cathartics. We have also found much benefit from the employment of the pill *Ext. col. co. gr. iii*; *Pulv. ipecac. gr. i*. In melancholia we use morphia in solution, alone or combined, with *hyoscyamus*, and on the anæmic and enfeebled we believe its primary stimulating effect on the brain highly beneficial. In such cases we give it in doses of one-quarter to one-half grain three or four times daily, and often combined with whiskey, wine, brandy, or ale. With these we give raw eggs, or eggs and milk, and other highly nutritious animal food, and with the most satisfactory results. Some very unpromising cases of melancholia admitted during the past year have recovered rapidly under this treatment. We have given as much as one and a quarter grs. of morphia, and from four to ten eggs daily, in critical acute cases, in addition to other nutrition, with marked advantage. We have also used in special cases, when indicated, *tinct. lupuli* and *tinct. conii*, with more or less benefit.

"In the excited and sleepless stage of general paresis we have obtained favourable results from *tinct. cannabis Ind.*, either alone or with *tinct. digitalis*, and in some cases from bromide of potassium.

"This latter remedy we have used largely in epilepsy for the past three years especially, but we have not found as much benefit to result from it as we had been led to hope for from the accounts in some foreign journals of its value in this disease. * * *

"We have administered the bromide in cases of high nervous irritability, with subacute maniacal excitement, and in cases of restive, agitated melancholia, with the most satisfactory results.

"As an anaphrodisiac it is a highly valuable medical remedy. We can recommend it as one of the most effective to control the phrodisiac state so often unhappily associated with insanity. * * *

"As tonics we use the ordinary tinctures of *cinchona*, *gentian* and *columbo*, and often combined with some preparations of iron, though we depend on ale more largely in conditions of general enfeeblement, and on the above as adjuvants. We also use cod-liver oil with ale or wine in many of these cases. We have reason to believe that several preparations of iron act beneficially on the nervous system, both directly as stimulants, and at the same time furnish material for the blood, as maintained by some authorities.

"In concluding this portion of my report, I would add that nervines and such remedies as act on the spinal cord, and on the nerves of the vascular system, as well as the various alteratives and stimulants, are administered in all stages of insanity, as indications may arise. About one-fourth of all admissions are so far prostrated as to require, in addition to medication, for a longer or shorter

period, extra diet, such as concentrated soup, essence of beef, eggs, oysters, milk, or beef extract."

2. The numerical results of the operations of the *King's County Lunatic Asylum* (N. Y.), for the fiscal year ending with the 31st of July, 1866, are as follows:—

	Men.	Women.	Total
Patients at the beginning of the year,	186	246	432
Admitted in course of the year,	111	132	243
Whole number,	297	378	675
Discharged, including deaths,	99	106	205
Remaining at the end of the year,	198	272	470
Of the discharged there were cured,	40	49	89
Died,	32	33	65

Died of phthisis, 17; exhaustion, 10; paralysis, 10; general paralysis, 8; apoplexy, 3; congestion of the brain, 4; meningitis, 4; softening of the brain, 2; diarrhoea, 2; epilepsy, atrophy of the brain, carcinoma, typhoid fever, and suicide, 1 each.

"The Asylum has been free from contagious, epidemic or zymotic diseases during the year, with the single exception of a case of typhus fever, which was contracted before admission."

The hospital is crowded with patients, and Dr. Chapin recommends its enlargement by the addition of a section to each of the two wings.

3. "During the past year," remarks Dr. Butler, in his report for the official year 1865-66, of the *Retreat for the Insane*, "the wards of the institution have continued to be overcrowded." The number of patients has exceeded that of any preceding year.

	Men.	Women.	Total.
Patients in hospital, April 1st, 1865,	119	119	238
Admitted in course of the year,	69	96	165
Whole number,	188	215	403
Discharged, including deaths,	63	95	158
Remaining, March 31st, 1866,	125	120	245
Of the discharged, there were cured,	20	42	62

"Of the deaths, 12 were of males, and 14 females. Of these, 7 were from exhaustion of acute mania, 6 from simple exhaustion, 3 from chronic diarrhoea, 2 from dysentery, 2 from disease of the lungs, and one each from apoplexy, diarrhoea, asphyxia, abscess, pneumonia, and paralysis."

The Doctor congratulates the Board of Directors "upon the great improvements which have been made about the Institution during the past year. Since the grounds were laid out and ornamented according to the admirable and successful plans of Messrs. Olmstead and Vaux, in 1860, nothing has added so much to the beauty of the surroundings of the Retreat. The old close and unsightly fences about the buildings have all been removed, and now, ornamental, and, in some places, light, open fences have been erected in their stead."

This report is unusually brief, in consequence, as therein intimated, of the ill-health of Dr. Butler—a fact which his many friends will regret. For this reason he excuses himself from a further consideration of the treatment of the chronic insane, a subject discussed in his preceding report. He estimates the number of insane persons in Connecticut to be seven hundred, while "the reasonable capacity of the Retreat, the only Lunatic Hospital in the State, is two hundred and ten."

This deficiency of hospital accommodations is about to be remedied. A legislative Board of Commissioners have recently selected a site for a State Hospital.

4. The number of patients and the results for the year 1865, at the *Butler Hospital for the Insane*, are as follows:—

	Men.	Women.	Total.
Patients at the beginning of the year,	67	65	132
Admitted in course of the year,	25	17	42
Whole number,	92	82	174
Discharged, including deaths,	22	21	43
Remaining at the end of the year,	70	61	131
Of the discharged, there were cured, . . . . .	.	.	11
Died, . . . . .	.	.	16

Nearly the whole of this report consists of an essay upon the now much agitated subjects—the treatment of the incurable insane, and the value of their labour as an element in the means of support. The argument is detailed and exhaustive, with the exception of a single point, which, as appears to us, is of very great importance. The Doctor overlooks the fact, mentioned by Dr. Gundry, and some others, that, if the incurable be separated from the curable, the two classes being provided for in different institutions, the amount of remunerated labour at the hospitals for curables will necessarily be much increased.

Inasmuch as all the general heads of this essay have been mentioned in our notices of the reports of other institutions, and in consequence of the difficulty of making any satisfactory *abstract*, which should not include *the whole*, we must refer such of our readers as desire to see it, to the report itself, merely copying one passage for its historical value.

"In the early stage of this benevolent enterprise of establishing hospitals for the insane, one of the principal objects proposed by it was the proper care and custody of the old incurable cases. It was their sufferings as exhibited in the jails and poor-houses of the country, which, some five and thirty years ago, led Horace Mann and a few others to begin that movement, the first fruits of which were the hospital at Worcester. They laboured, as they supposed, for the poor, the neglected, the friendless, the hopeless, not for the wealthy and curable, who might be safely left to the ministry of their friends. For a time it seemed as if the precise object of their labours had been accomplished and placed beyond the reach of any change of fortune. The jails and poor-houses were emptied of these unfortunates, and an incalculable amount of relief from the last extremity of human wretchedness was effected. A more curious change of purpose has seldom been witnessed than that which has been induced on this subject by the very development of the original enterprise itself. For whereas the object at first was to place all these persons in the hospitals, the question that agitates the philanthropists of our day is, how best to get them out of the hospital."

5. The late Moody Kent, Esq., a lawyer of Concord, N. H., has made the New Hampshire *State Asylum* his residuary legatee, and the amount thus coming to the institution will amount to the handsome sum of one hundred and forty thousand dollars.

	Men.	Women.	Total.
Patients in hospital, May 1, 1865	103	120	223
Admitted in course of the year	55	49	104
Whole number	158	169	327
Discharged, including deaths	50	41	91
Remaining, May 1, 1866	111*	125*	236
Of those discharged there were cured	12	14	16
Died	13	8	21

* The numbers here should be 108 and 128 to be consistent with the foregoing figures. We have followed the *text* of the report, and Dr. Bancroft is one of several of the Superintendents who, because they do not believe that "figures can't lie," or for some other reason, put all their principal statistics into Roman text, instead of Arabic numerals. We take this occasion to remark—what we have many times before thought of saying—that, in our reviews of reports, we have found probably twice as many errors, proportionally, in those which give the statistics in words, as we have in those which give them in numerals: so that long ago came to the conclusion that if "*figures can't lie*," Roman text can.

Causes of death.—Exhaustion of acute mania, 3; “gradual wasting of the powers of life from chronic mania, 5; organic disease of the brain terminating in effusion, 2; tubercular consumption, 3; diarrhœa, 2; apoplexy, 2; paresis, 1; “slow decline of life,” 2; intestinal obstruction, 1.

“Each successive year shows a larger amount of labour done, in various ways, and a larger variety of entertainment and amusement afforded, with increasing evidence of their value.”

Dr. Bancroft shows that the hospital is crowded with patients, and recommends an enlargement of the building. It appears from his report that the Trustees have decided not to expend any of the principal of the above mentioned legacy, but to preserve it “forever entire,” and to appropriate the interest of it, first, to “the support of indigent private patients, and, secondly, to “extraordinary improvements” and “hygienic and curative agents.” A large part of the report is occupied by an exposition of the distinctive traits of several forms of insanity, and of the wide field still open for improvement in the facilities for the treatment of them. Doubtless but few years will pass before this hospital will be abundantly supplied with the means of moral treatment.

P. E.

ART. XVII.—*A Treatise on the Practice of Medicine.* By GEORGE B. WOOD, M. D., LL.D., etc. etc. 2 vols. 8vo. pp. 1002—982. Philadelphia, 1866: J. B. Lippincott, & Co.

THE treatise of Dr. Wood has been before the public now for nearly twenty years, during which time it has run through six editions, and has received the almost unanimous approval of the profession, abroad as well as at home. It may now be received, therefore, as a standard authority in respect to medical doctrine and practice—a work highly creditable to its author as a professional writer and teacher, and one which is a valuable addition to the medical literature of our country.

In the edition before us every chapter bears the marks of careful revision, while the entire treatise has received such additions as were demanded by the progress of medical observation and improvement in respect to particular diseases or classes of disease: from either the opportunities which have been furnished us for the better study of their pathology, or from the light that has been thrown upon their nature and causation by the recent advances that have been made in our knowledge of the physiology of the human organism; the treatise being brought fully up to the present state of our science and art.

The work of Dr. Wood is particularly well adapted for the use of the advanced medical student; as well of those who have recently entered upon the practice of their profession, and who still feel the necessity for some reliable guide to direct them in their clinical study of diseases and their remedies. It is sufficiently full, clear, and accurate in its description of the maladies of which it treats, and perfectly sound and consistent in its pathological teachings, while its therapeutical directions are those which have received the sanction of the most experienced and successful practitioners of this country and of Europe. There is no attempt in any part of the treatise to attract attention or elicit applause, by bewildering generalities, or startling novelties in doctrine, or unusual plans of cure. The single aim of the author from first to last has evidently been to impart, with plainness and simplicity, useful and well-established truths, pathological and therapeutical, to serve as a guide alike to the student and young practitioner of the healing art.

We could have wished that the author had embodied in the text the greater part, at least, of the matter now contained in notes at the bottom of the pages, the reduction effected in the bulk of the volume by the use of these notes is no adequate compensation for the awkward breaks, in the course of the instructions caused by the repeated consultation of foot-notes.

D. F. C.

ART. XVIII.—*Practical Treatise of the Physical Exploration of the Chest and Respiratory Organs.* By AUSTIN FLINT, M. D. Second edition, revised. 8vo. pp. 595. Phila.: Henry C. Lea. 1866.

THE present edition of this valuable and well-known work contains a very full account of the physical examination of the thorax. It seems to us, however, to be much too extended for the use of students. The history of the signs is, in the main, well developed and accurately described. The author quotes largely from different European writers on the subject, although some American authors might justly complain of not receiving a single citation.

The main descriptions are well detailed, although we do not agree with all the author's remarks; for instance, he says:—

"In practising immediate auscultation it is well to accustom one's self to the use of either ear indifferently, if the sense of hearing be equally acute in both."

Now, from a vast deal of experience in teaching young men during the last thirty years, we are satisfied that a very small proportion can use both eyes or both ears equally well. Indeed, if they possess this acuteness of hearing equally well in both organs, the habit of cultivating one of them especially, will give it an extraordinary power much greater than could be attained by both.

Distinction between the crepitant and sub-crepitant rhonchi is not clearly pointed out, nor is the crepitant rhonchus stated to belong exclusively to the act of inspiration. Besides, the crepitant-rhonchus is not really the first sign of pneumonia. This is always a rude respiration, crepitant rhonchus appearing generally a day or two afterwards; sometimes, however, the crepitus begins, although very rarely, with the very first symptoms. In these cases we believe that the rhonchus is heard because the interval has been passed over, before the examination of the patient, in which congestion of the lung produces a rough sound of respiration previously to the crepitation. For the crepitus is produced in the vesicles and finest tubes after the mass of the lung is filled with blood, which condition of course makes the respiration rude. In every case we believe that this occurs before the minute tubes and vesicles impeding the passage of the air by their stiffness, produce true crepitus.

The friction sound of pleurisy is not well described by the author. Friction is always heard at the very earliest stages of pleurisy, unless in those cases in which there is but little pain in the thorax, although the pleura is without a consistent or genuine example of the sound. It is slight, but is easily recognized by any one carefully seeking for it, because it is felt as well as heard, and even to the ear, although the sound is sometimes very slight, it does not at all resemble any variety of proper bronchial rhonchus. The peculiarities of the friction sounds of pleurisy were long ago pointed out in this city, and have been explained to the students every year.

The fact of which the author is aware in certain cases only, is, as we have already stated, the regular occurrence of rude respiration at the very beginning of pneumonia. The error is, that he has not said always, for it certainly does occur whenever the patient is examined at the very first stages of the disease, although sometimes a very short time elapses before the occurrence of crepitation.

"In some instances, while the area of the inflamed lung is limited, especially if it be situated near the surface, a broncho-vesicular respiration precedes the appearance of other signs."

We are not however disposed to extend our inquiries into the smaller matters upon which the author has been led into error. In the main the book is a very good one, with the exception of its too great diffuseness, which must impair its usefulness for students of physical exploration. It contains, however, a very complete account of the subject.

W. W. G.

ART. XIX.—*A Practical Treatise on Fractures and Dislocations.* By FRANK HASTINGS HAMILTON, A. B., A. M., M. D., Professor of the Principles of Surgery, Military Surgery and Hygiene, and of Fractures and Dislocations in Bellevue Hospital Medical College; Surgeon to Bellevue Hospital and to the Charity Hospital, New York; Professor of Military Surgery, etc., in the Long Island College Hospital; author of a *Treatise on Military Surgery*. Third edition, revised and improved, illustrated with two hundred and ninety-four wood-cuts. 8vo. pp. 777. Philadelphia: Henry C. Lea, 1866.

On the appearance of the first edition of this valuable treatise, in 1860, it was fully reviewed in this Journal (see number for April, 1860, p. 419, et seq.), and the opinion expressed that it well supplied a want long felt in surgical literature, and that it would take rank as a work of classical authority. This judgment has since been confirmed by every reviewer, both in this country and abroad, as well as by the profession generally.

Since the publication of the original edition, the author's experience has been largely extended in military hospitals and in the ample fields of instruction afforded by Bellevue and Charity Hospitals, New York, as well as in private practice; and the results of this experience, and also the information gleaned from the careful study of the cases and observations recorded in recent journals, have been incorporated in the present edition. Several changes have been made in the illustrations and some new ones added. The frequency with which even surgical writers confounded epiphyseal separations with fractures, has determined the author to select from Gray's excellent treatise upon Anatomy a number of illustrations indicating the centres of ossification and the subsequent development of bone. The chapter on "Gunshot Injuries" has been enlarged by the addition of a few statistics obtained from the published records of both armies.

These additions make the work much more valuable, and it must be accepted as the most complete monograph on the subject, certainly in our own, if not even in any other language.

ART. XX.—*Orthopedics: A Systematic Treatise upon the Prevention and Correction of Deformities.* By DAVID PRINCE, M. D. 8vo. pp. 240. Philadelphia: Lindsay & Blakiston, 1866.

This treatise upon Orthopedics has been prepared, the author states in the preface, with special reference to the wants of physicians engaged in general practice. He has succeeded admirably in preparing a work which will be of great assistance to men busily engaged in practice who desire to quickly learn how deformities are most readily and surely to be prevented and remedied. To such persons we recommend this treatise as beyond all comparison the best that we have seen.

The book is well printed, and illustrated by ninety-three wood-cuts.

W. F. A.

ART. XXI.—*Elements of Medical Chemistry.* By B. HOWARD RAND, M. D., Professor of Chemistry in Jefferson Medical College. 12mo. pp. 399. Philadelphia: T. Ellwood Zell & Co., 1867.

THERE are two objects which may be held in view in preparing scientific works. They may be designed to promote the knowledge of the science of which they treat, by recording and collating new facts, or arranging known facts in new

lights with reference to more enlightened theoretical views, or they may aim to bring familiar facts and accepted explanations to the view of minds hitherto unacquainted with them, and especially to give them some practical and useful direction. To this latter class belongs the little work of Dr. Rand. It does not profess to go into details, but presents the general principles of chemistry in a concise form, and treats of the relation of the science to medicine. It is rather more concise than would be considered best for a student applying himself to master even the limited branch of knowledge which has been termed medical chemistry; but in view of the cramming system, almost of necessity adopted in our medical schools, it seems a useful book, and has the great merit of being up with the times. We notice among the paragraphs under the head of Analysis, one devoted to spectral analysis, the process by which the new metals Cæsium, Rubidium, Thallium, and Indium have been discovered, and by which the constitution of the sun and stars have been recently investigated. Dialysis is also described. Under the head of Dynamical Electricity, the galvanic or Voltaic and electro-magnetic phenomena are somewhat illustrated, and their medical applications receive attention. The peculiar influence called by some *presence*, by others *catalysis*, by which ferments act, in starting decomposition, the rationale of which is not known, is designated, after Liebig, as "*Example*," a term more familiarly recognized in human affairs than in the movement of inanimate atoms. Under the head of Organic Chemistry, numerous chemical products are briefly described, and something like a classification attempted, but it is hard to embrace within the limits of a brief treatise even a glimpse of that expansive science which in our time has opened such vast resources to medicine and to the arts. To adapt this book more perfectly to the uses of the student, it has an Appendix containing Tables of Weights and Measures, Incompatibles, Antidotes, List of Minerals with their Chemical Composition, and a Glossary.

E. P.

ART. XXII.—*Food and its Digestion*. Read before the Albany Institute, February 27th, 1865. By HOWARD TOWNSEND, M. D., Professor of Physiology and Materia Medica, Albany Med. Coll. 8vo. pp. 18. Albany. 1866.

THIS very slight and imperfect sketch of the subject indicated on its title page, was read before a non-professional audience, and was one, perhaps, sufficiently full in its details, and handled with sufficient scientific accuracy for the wants and appreciation of such an audience, and better adapted to lure them to a more intimate study of the subject, than would be one distinguished for its profundity and exhaustive range. For those destined to the study and pursuit of the science and practice of medicine it is altogether unadapted. In this latter character, however, it is but justice to its author to say that he never thought of presenting it.

D. F. C.

ART. XXIII.—*Genito-Urinary Fistulæ*.

1. *Des Fistules Gêno-urinaires chez le Femme*. Par IGNACIO RODRIGUEZ DA COSTA DUARTE. 8vo. pp. 96. Paris: J. B. Baillière & Son, 1865.

Female Genito-urinary Fistulæ. By DA COSTA DUARTE.

2. *A Treatise on Vesico-Vaginal Fistulæ*. By M. SCHUPPERT, M. D. Surgeon of the Orthopædic Institute at New Orleans, La. 8vo. pp. 36. New Orleans: 1866.

1. THE author of the first of these publications is evidently a Portuguese; he seems to us to have thought, even if he did not originally write, in that language; hence, his French is not at all times clear and easy of translation.

However, this *brochure on Genito-urinary Fistulae in the Female* is quite a meritorious production, and worthy of being better known than it can be while veiled from so many professional readers by the language in which it is published.

The author divides *Genito-urinary Fistulae* as follows: *urethro-vaginal*; *vesico-vaginal*; *urethro-vesico-vaginal*; *vesico-utero-vaginal*; *urethro-vesico-utero-vaginal*; *vesico-uterine*; and *urethro-uterine*—a classification which, while anatomically correct, is practically the best, and is very nearly the same as that made by Jobert.

In the general discussion of the *etiology* of these lesions he makes the subjoined statements as to *Age*, *Previous Accouchements* and *Instruments*:—“The elasticity of human tissues is inversely proportionate to the age, and it is at an advanced age that we frequently meet with hypertrophy of the uterine neck which would much delay its dilatation. Nevertheless, I think that primiparae who are advanced in life are very liable to genito-urinary fistulae; but multiparae are not less liable, in the same condition of age, because in addition to the hypertrophy of the uterine cervix which may exist, an additional obstacle to its distension would be found in the inodular tissues resulting from laceration in previous labors. * * * Availing myself of the statistics published by Monteros, *Essay upon the Treatment of Genito-Urinary Fistulae in the Female*, Paris, 1864, and of D’Andrad’s, *Essay upon the Treatment of Vesico-Vaginal Fistula by the American Method*, Paris, 1860, I find that the first gives 121 cases of these different fistulae, and the second 67. Deducting from the joint number 16 cases in which the age is not recorded, of the 173 which remain there were but forty under twenty-five years of age, and only six under twenty; this seems to me to prove that advanced age favours the occurrence of these lesions. In the same statistics, omitting 16, in which the number of accouchements is not stated, we find that 78 of the 173 were primiparae; this proportion of less than one-half establishes my assertion. M. Monteros has published three very remarkable cases; one of an accouchement occurring at sixty years, a primipara at fifty, and another fifty-one.”

Our author states his belief that the applications of instruments, and the manipulations which they require, constitute the cause of these lesions in many cases. For our own part, we fully believe that delay or neglect in resorting to instruments in protracted labour, has more to do ten times over with their production than all the instruments, obstetrical or surgical, that were ever made use of in this part of the body. When we remember that the large majority of practitioners never resort to forceps, or craniotomy instruments, when we hear now and then of women being permitted to remain in labour two, three, or four days, our only wonder is that these maladies are not more frequent. Only yesterday we examined a patient with vesico-uterine fistula, which had its origin fourteen years ago in a labour which was allowed to continue four days, the child hydrocephalic, before operative measures were resorted to; here it was not the puncturing on the fifth day of the distended fetal head, but the failure to do this on the first or second day, which caused the mischief.

While referring to the *etiology* of these maladies, we cannot forbear mentioning a case which was presented to Wutzer, where the fistula resulted from the effort to restore the vaginal canal—the fistula was cured by thirty-seven cauterizations!—since it had an uncommon cause, and at the same time illustrates one of the dangers of this difficult operation, an operation which even in the skilful hands of Amussat, did not always terminate well, so that some in preference to attempting it have resorted to rectal puncture (see Dr. Oldham’s report of two cases thus treated, *Groß’s Hospital Reports*, 3d Series, Vol. III.), where the uterus has, subsequently to the vaginal occlusion, become distended with menstrual secretion.

Passing from this general consideration of the *causes*, we have, in order, the relative *frequency*, the *pathological anatomy*, the *symptoms* and *diagnosis*, and the *treatment*. Then follows a similar discussion of each of the several varieties of these fistulae. We have given us with all its details, from Jobert’s *Traité des fistules vesico-utérines*, the important case in which the history of the production of the fistula and the post-mortem appearances of the subject have

been so carefully recorded by Professor Stoltz, of Strasburg, as well as the very extraordinary case which occurred to Mr. Lane (*Lancet*, February, 1865), where this distinguished surgeon, after closing the os uteri for a vesico-uterine fistula most satisfactorily, subsequently, in consequence of uterine distension and distress, punctured the uterus, the puncture being followed, to his great surprise, by an abortion of a four months' fetus; and again closure of the os uteri was successfully resorted to. The reports of these two cases, with one from Baker Brown, make up nearly one fourth of the volume.

Our author confines himself, in giving operative procedures, to three—those of Jobert, Simon, and Sims, declaring, as is just, his decided preference for that of the last. These methods are so familiar to all surgeons that it is needless to mention them. There is a point omitted, however, in the description of Simon's method as we understand it, and which seems to us of some practical value; this is in the way in which resection of the fistulous edges is done—first penetrating with a pointed bistoury the entire thickness of the tissue to be removed, and then inserting a blunt-ended bistoury in the opening thus made, and cutting round the fistulous border—a method which would greatly help to secure two important desiderata in these operations, regularity and completeness of freshened surface.

The third and last chapter of this work is upon *Treatment of Lesions regarded as Incurable*, in which, after alluding to closure of the vaginal outlet as a remedial measure suitable for certain cases, a case presented to the author is adduced in which there was "rupture of the anterior wall of the vagina, obliteration of the urethra and complete section of one part of this canal, displacement of the bladder and prolapse into the vagina, rupture of the inferior fundus of the bladder, narrowing of the vagina, great constriction of that portion of it embracing the neck of the uterus, and uterine retroversion."

The urethra might be made permeable, and the vulva occluded, but how prevent urinary incontinence? Here is the author's suggestion¹ as to an operation preliminary to closing the vaginal outlet, an operation which the patient was unwilling to submit to, but which strikes us as being quite feasible, and might be well worthy of being resorted to in a similar case. "The basis of my proposed operation consists in making use of the sphincter of the anus to retain the urine; and for this purpose I propose to make an opening through the posterior wall of the vagina into the rectum, getting as far above the sphincter as possible, and at the same time carefully avoiding the utero-rectal cul-de-sac."

In conclusion, we have been much pleased with this monograph; we only wish that with the same excellence of general design and arrangement, there had been more of detail—a more thorough and complete discussion of the whole subject.

2. We have given so much space to the consideration of the first of these publications that our remarks in reference to the second must be brief. The latter contains in addition to the thirty-six pages, large octavo, text, several lithographs, the excellence of which is not striking, representing the instruments used by the author, and some sixteen cases of vaginal fistulæ.

The treatise embraces the following subjects discussed in order: Definition; Causes; Operation; After-Treatment; Cases; History of the Operation.

Dr. Schuppert, under the head of *Causes*, observes very justly, as we think, though in opposition to the statement of an American author on Diseases of Women, that "in the majority of instances a vesico-vaginal fistula originates through the mortification of a portion of the vagina and bladder, in consequence of these parts being compressed by an impacted portion of the fetus, the head or breech pressing against the os pubis, thus preventing circulation of the blood in the tissues involved." But his statement that in the majority of cases the injury happens in the first labour, would seem to be contradicted by the statistics already given from Da Costa Duarte.

Dr. S. gives a very clear and full account of his method of operating and of the after-treatment of his patients, which are in most respects the same as are

¹ This plan is really that of Maisonneuve.

adopted by operators at the present day. The differences are, 1st. his sutures penetrate the entire thickness of the fistulous border, having before his eyes no fear of irritating the vesical mucous membrane; 2d. he uses injections of cold water every thirty minutes for the first forty-eight hours after the operation; and 3d. he dispenses with opium as an essential in the after-treatment. As to the first, other operators have done likewise in placing their sutures, among whom we may mention Dr. Hayward; but the general verdict of operators is against the plan, and we do not believe it is based upon sound theory, or upon generally successful results. As to the second, a similar practice was resorted to by Esmarch, whose success in the treatment of vaginal fistulæ, we believe, was quite equal to that of Simon.

In addition to several cases of fistulæ¹ successfully treated, with two exceptions, in the usual method, Dr. Schuppert here reports two cases of *obliteration of the vagina*, one of which was obtained by the method known as *episiorrhaphy*. Even what is known as *transverse obliteration* of the vagina much oftener fails than succeeds; the statistics in Professor Günther's *Operative Surgery* give nine cases and only one of them successful, while episiorrhaphy was resorted to thrice in one subject, and failed; it has failed too in other hands, not only failed of a successful result, but in at least two subjects been followed by death; we believe Dr. Schuppert is correct in claiming for himself the first successful case in which this operation has been performed, and it is proper that he should be congratulated upon the fortunate result.

The author gives a *résumé* of the methods of treatment of vaginal fistulæ which have been resorted to in France, Germany, England, and America. Nevertheless, this is not complete, nor do we think it entirely free from erroneous statements. Illustrative of the former, among French operations we do not find any mention of *Maisonneuve* (which our author will spell *Massonneuve*), separating the urethra from the pubic arch having similar object as Jobert's partial detachment of the vagina from the cervix uteri, a practice which has been imitated by some other operators, and which might in some cases be very advantageous; illustrative of the latter, when he refers to German operators, we find Nægèlè spoken of as having operated in a particular way, "uniting the edges with small tape and the interrupted suture," &c. But in the work by Professor Günther, just referred to, Dr. Benno Schmidt, who is the author of the very complete chapter on the *Operative Treatment of Vesico-Vaginal Fistulæ*, uses the following language: "The disused suture was again brought into notice by Lewzisky in 1802, and by Nægèlè in 1842. Both, however, simply proposed, without ever executing the plan upon any living person."

Upon the whole we have found ourselves well repaid for the perusal of Dr. Schuppert's treatise, though we cannot fully appreciate its *grandiloquent* dedication to the "Czar of all the Russias," nor can we commend the *brusqueness* of some of his remarks on the methods of contemporary surgeons.

In terminating this notice, we cannot forbear calling attention to two instruments recently invented, which we think quite useful in some of the operations for vaginal fistulæ, and which we would be glad to have seen mentioned by Dr. S. The one is designed for very small fistulæ situated high up in the vagina, and consists of a curved steel sound provided with four elongated points—a sort of harpoon which being first thrust through the fistulous opening and then partially withdrawn, catches and holds the edges so that they can be readily pared; this is the invention of Dr. Banon, of Dublin. We are pleased to see that Dr. Agnew, of Philadelphia, speaks well of this instrument, though the name of the inventor is not mentioned. The other instrument which we wish to mention is the "guide" made use of by Mr. Bryant, of Guy's Hospital, the advantages of which are the completeness, the readiness and regularity with which

¹ One patient died of *pyæmia* eight days after the operation, and another succumbed to tuberculosis nine months after being operated upon, and the fistula diminished, not cured. The author's fourteenth case is given as *urethro-recto-vesico-vaginal fistula*. But that there is no such fistula as this must be obvious—there were two *fistulæ*, the one *urethro-vesico-vaginal*, and the other *recto-vaginal*.

the fistulous margins are resected. For drawings of this instrument, with one, two, or three prongs, and as modified for transverse or vertical fistulae, as well as a full explanation of the method of using them, the reader is referred to the last volume of *Guy's Hospital Reports*.

T. P.

ART. XXIV.—*Cancer: A New Method of Treatment*. By W. H. BROADBENT, M. D., London, Assistant Physician to St. Mary's Hospital, &c. 8vo. pp. 28. London: John Churchill & Sons, 1866.

THE main facts contained in this pamphlet were brought before the British Medical Association at its last meeting, but the paper was so curtailed in publication as to defeat the purpose of the author in bringing the subject fully before the profession, and hence he has been led to publish it in its present form.

The idea presented itself to the mind of Dr. Broadbent, that, by means of the hypodermic syringe, some fluid might be injected into a cancerous tumour, which might so far alter its structure, and modify its nutrition, as to retard or arrest its growth. After some reflection acetic acid was selected for the following reasons:—

"1. This acid does not coagulate albumen, and might therefore be expected to diffuse itself through the tumour. The effect would thus not be limited to and concentrated in the point injected.

"2. If it entered the circulation it could do no harm in any way, either by acting as a poison or by inducing embolism.

"3. Acetic acid rapidly dissolves the walls and modifies the nuclei of cells on the microscopic slide, and might be expected to do this when the cells were *in situ*.

"4. It had been applied with advantage to open cancer and to cancerous ulcerations.

"The experiment was made, and it was found that acetic acid, though in healthy tissues it causes very severe smarting and burning, unless very strong, gives little pain when thrown into malignant structure. On the other hand it acts energetically on cancer, but has comparatively little effect on normal structures."

Four cases on which these conclusions are based are given in detail in the pamphlet under notice. These cases Dr. B. thinks "sufficiently establish the correctness of the anticipation formed as to the action of acetic acid—that no unfavourable results arise from absorption of the acid into the blood—that it permeates every part of the tumour more completely than would any fluid coagulating albumen—and that it acts energetically on cancerous structures. Even in a comparatively dilute state, and when it cannot be looked upon as in any sense caustic, it breaks down the substance of malignant tumours. The process seems more like solution than sloughing or suppuration, and is not necessarily attended with pain or constitutional disturbance. The first case furnishes the most striking illustration of the remarkable influence of acetic acid. The result of the first injection went beyond my anticipations, and produced an effect I had not anticipated, and did not at the time desire. As I could see the patient only at rather long intervals, the caution always necessary in early experiments of this kind had to be redoubled. In a similar case a much shorter time would now suffice to bring about the same result. It is certain, however, that different cases will demand special modifications of the treatment; some may require stronger acid, others weaker; some long intervals between the injections, others short; in some it may be better to throw in the acid quickly, in others very gradually. These points can only be settled by experience.

"It has not yet been demonstrated that a malignant tumour may be entirely and cleanly rooted out at once. At its periphery, where diseased joins on to healthy structure, it has more vitality than in the centre, and in the case referred

to, great difficulty was experienced in removing the portions left behind when the mass of the tumour had been destroyed. Much more pain was given in this attempt than in the previous proceeding. A considerable portion of the wall of the cavity was, however, from the first, denuded of malignant structure, and there seems to be no reason why this should not have been the case at all points, had the injections been more complete. This result should always be aimed at when the removal of an unbroken tumour is undertaken.

"As to the pain resulting from the injection of acetic acid, the difference between cancer and healthy tissue was remarkable in all the cases. In the first: acid, which had caused scarcely any pain when injected in considerable quantity into the substance of the tumour gave rise to acute smarting, when a single drop entered the subcutaneous connective tissue. This was still more strikingly shown in the case of the axillary glands. In the cancer of the rectum the occurrence or not of pain was an invaluable indication as to whether the point of the needle was in the substance of the tumour, or in healthy structures, or free in the canal after passing through a nodule of cancer, or gliding over its surface. The difference was by no means so marked in the case of epithelial cancer of the tongue, and in another instance of this form of cancer I have seen the same thing. Within the last few days I have also found injection of a solid tumour to give considerable pain, and Mr. I. B. Brown, jun., has stated to me that this has occurred in a case under his care, so that immunity from suffering is not always to be counted upon."

The theoretical grounds upon which Dr. B. founded his hope that the vitality and nutrition of cancerous growths might be so far modified as to check their progress and dissemination without necessarily causing their suppuration or sloughing, he states to have been as follows:—

"1. Cancer owes its malignancy, not to any peculiarity of chemical composition, but to its characteristic structure. It is made up of cells to employ a terminology almost antiquated, which, retaining more or less the fetal type, retain also the fetal capacity for indefinite multiplication, but do not undergo development into perfect tissues. To alter these cells will be to put an end to their power of dividing and multiplying, and consequently to arrest the growth of the tumour.

"2. In acetic acid we have an agent which, on the microscopic slide, rapidly effects important changes in cells of every kind, dissolving the cell-wall, and affecting the nucleus. Not coagulating albumen it may diffuse itself through a tumour, and reaching every part equally it may probably produce similar results when the cells are *in situ*.

"Experimentally, it has been seen that acetic acid does diffuse itself as was anticipated, and a striking proof was afforded of this fact in the very first injection practised. Again, it has been found that it attacks the cells so effectually as completely to destroy their vitality and produce solution of the tumour. The point to be determined is, whether it may not be so applied as to stop short of this result and alter the cells, impair their vitality, modify their nutrition, or even dissolve or destroy them, but leave any fully organized tissue, or remains of the invaded structures. The tumour would, in this case, cease to spread, and would shrink and contract."

In considering the application of this treatment to various cases, Dr. B. remarks: "There are two distinct results which may be aimed at: the yet uncertain effect last spoken of, arrest and withering of the tumour, or its death and removal.

"The former might be sought in any example of accessible tumour, in which the skin is not involved. Cases of scirrhus would seem to be those in which success might, with most reason, be hoped for, as more fibrous structure is found in them, and a tendency to shrinking and withering is often seen in this class of tumours.

"The destructive effects may be looked upon as always in our power—whether this should be resorted to in all or in many cases, must be determined by experience. In cancer of the rectum, it offers a valuable means of removing obstruction and relieving pain. In the case described, it has lengthened life. It may, perhaps, do more. In cancer of the uterus it will, probably, be found of

equal or greater service, and the application will certainly be easier than to disease of the rectum.

"In epithelial cancer of the integument, or of the tongue, a difficulty is met with from escape of the fluid at the surface. Experience alone can determine the value of the injection of acetic acid, or its employment in other ways in these cases, as compared with other methods practised.

"Speaking generally, wherever treatment by caustics of whatever kind is to be preferred to removal by the knife, this method would seem to offer greater facility of employment, and to be attended with less pain. In subcutaneous tumours, if the skin were not involved, it might probably be necessary to make an incision when the cancer had been softened down, but in these cases arrest should first be attempted. When a solid tumour has invaded the skin, this will slough and leave an opening through which the *débris* may escape. In open cancer the fungous masses might be removed, and the irregular, foul, and painful ulcer, with its offensive discharge, be replaced by a comparatively clean surface, without fetor or pain."

Dr. B. says he is not prepared to lay down precise rules for the employment of the acid, but his experience inclines him to the use of a large quantity of dilute acid, rather than of a smaller proportion in more concentrated form. The strongest acid he has used has been composed of equal parts of water and of the strong acetic acid of the Pharmacopœia; the weakest, one part to four or five.

"The injection should be gradual, especially when the tumour is dense, as pain may be inflicted either by escape of the acid by the side of the needle, or by the tension caused by the fluid forced in. The indication I shall take for my guidance will be pain. When this attends any operation, I should reduce the strength of the acid and the force of the injection until it is no longer severe, and only when this has proved inoperative go on to more energetic measures. Dr. Richardson's ether spray apparatus will be most useful in preventing pain."

Dr. B. concludes his paper with the expression of his belief that the acid treatment of cancer will be found to be a valuable palliative remedy, if not in some instances curative; and that it will be applicable to cases which have hitherto been beyond the reach of any remedial measures.

Should these anticipations be confirmed by further experience, Dr. Broadbent will have conferred the greatest boon on humanity—a boon which will associate his name with that of Jenner and other great benefactors of mankind.

Dr. Broadbent's paper has attracted considerable attention in England, and several surgeons are now engaged in trying the measure which he has proposed. It is being employed in the cancer wards at the Middlesex Hospital by Mr. Moore and Mr. C. De Morgan, at St. George's by Mr. Holmes, at the Marylebone Infirmary by Dr. Broadbent and Randall, and at the Westminster by Mr. Holt. (*See Med. Times and Gaz.*, Oct. 27, pp. 444-445.)

At the meeting of the Pathological Society of London, Oct. 16, Mr. Moore stated that "having heard Dr. Broadbent's paper at the British Medical Association, he at once adopted the plan recommended. He had since treated three recurrent cancerous tumours by the injection of acetic acid, and the result was that they disappeared—not a trace of them being left. The specimen Mr. Moore exhibited consisted of two cancerous glands, one of which only had been injected. The uninjected gland contained abundance of fusiform and nucleated cells. The injected gland was reduced to a brownish stringy pulp in which pools of oil floated. Under the microscope scarcely any fusiform cells were to be found—about one to four or five fields. There were found, however, corners and angles of cells and pus-corpuscles, granular masses, and abundance of fat.

"In reply to Mr. Lee, Mr. C. H. Moore said that the injection was only practised once. There was but one outward puncture, but the fluid was sent to different parts of the tumour by altering the direction of the point of the syringe.

"Mr. Power mentioned two cases in which this plan had been tried, but he only knew the result in one of them. This patient consulted Mr. Power for a malignant growth of the eyelid. Dr. Broadbent's plan of treatment was adopted,

and with surprising benefit. The tumour rapidly vanished, and Mr. Power believed the injection had really cured the disease."

The actual value of Dr. Broadbent's method of treating cancer cannot yet be determined, but it would seem, from the results thus far obtained, to lead to the hope that it may be beneficial in at least some cases.

ART. XXV.—*Contribution à L'Histoire des Mariages entre Consanguins*: par le Dr. AUGUSTE VOISIN, Méd. de l'Hospice de Bicêtre, etc. Extrait du Tome II. des Mémoires de la Société Anthropologie, 8vo. pp. 32. Paris, 1866.
A *Contribution to the History of Marriages between Blood Relations*. By Dr. AUGUSTE VOISIN, Physician to the Bicêtre Hospital, Paris, etc.

IN order to collect a series of facts bearing upon the subject of marriages among near relatives, and the results of such unions upon the health, physical or mental development, and duration of life of the offspring, Dr. Voisin took up his residence, during one month of the year 1864, in the village of Batz (*Loire-Inférieure*); a place where marriages among relations is of common occurrence; and made personal observations in respect to the topography, population, pecuniary condition and occupations of the inhabitants, their customs, their health, the duration of their lives, their grade of intelligence, instruction, morality, and religious deportment.

Accurate information was obtained by Dr. V. in reference to the results of 46 marriages—5 of which were between *consanguinité*, 31 between *second cousins*, and 10 between those of the *fourth degree of consanguinity*; leaving out of the question numerous marriages between relations of the fifth and sixth degrees, of which latter relationship he found to be the greater number of the married couples in the village. The result of the information thus derived, was that in the community of Batz marriages between persons related by blood had no injurious influence upon the children born of such marriages. That among these children there existed no vices of conformation, no mental affections, no idiocy, cretinism, surdmutism, epilepsy, or albinism. Scrofula existed in only one young girl. Sterility is almost unknown. Two only related in the third degree of consanguinity of the forty-six pair referred to were childless. Of the remaining 44 couples the offspring amounted in all to 174.

The most part of the children have an intelligence beyond that ordinarily observed at their age; they are lively and cheerful in disposition, and apt to acquire knowledge.

The inhabitants of Batz are long-lived—preserving to the end a good degree of bodily vigour and mental power.

From his study of the question as above, Dr. V. has convinced himself that marriages of consanguinity are in no degree injurious to the children born of them, when the father and mother present no indications of any morbid diathesis, or of any hereditary disease, but are in good health, and of robust constitutions, and when they are placed under favourable conditions, climatic and hygienic. That under such circumstances, the marriages of cousins injure in no manner the immediate offspring or the race, but, on the contrary, exalt their condition.

D. F. C.

ART. XXVI.—*Alcoholic Diseases, comprising Jaundice, Diarrhea, Dysentery, and Cholera. With a Preliminary Dissertation on Bile, the Biliary Function, and the action of Cholagogue*. By ALEXANDER CHARLES MACLEOD, L. R. Q. C. P. L., etc. etc. 12mo. pp. 230. John Churchill & Sons, London, 1866.

WE do not recollect to have ever perused a medical work of the same size issued within the last half century, in which a system of pathology in relation to

any of the ordinary forms of disease, is so exclusively built up on bare hypothesis—on deductions drawn from imaginary premises, without a single indisputable fact to give them even the semblance of a foundation—as in the one before us.

Dr. Macleod is not only original in his pathological views, but he is equally so in some, at least, of his views in reference to physiology. Among other novelties advanced by him is the vicarious or subsidiary office to the liver performed by the mucous glands or follicles of the intestinal mucous membrane; especially when the blood of the portal system becomes "hyper-cholericized." The intestinal follicles or glands being considered by Dr. M. as, in effect, rudimentary livers.

A distinctive feature of the liver, and of every other secreting gland, is, Dr. M. remarks, the possession of an elective faculty enabling it to extract from a heterogeneous and ever varying fluid mass, just such elements as it has need of, rejecting all others. So, also, with the kidneys. The excretions of these organs consist entirely of matters foreign to the blood, and whose presence therein must consequently be hurtful. In respect to the kidneys, we know that the total suspension of their function, for even a short time, is generally fatal. The liver, it is true, separates also from the blood certain hurtful matters, but, besides this, its office is to eliminate particular elements, which almost immediately have to be restored into the blood again; it is, consequently, not to be expected that an interruption of the hepatic secretion should be attended with equally grave consequences. The addition, however, of bile being required for the due performance of the assimilative process and the production of healthy chyle, it is evident, that every diminution of the needful supply of bile must be followed by a corresponding defect in the work of digestion. Thus, when there is a minor deficiency in the supply of bile, we have, according to our author, *constipation*; when this has continued some time, "the bowels irritated by continued contact with hyper-cholericized blood, pours out mucus, converting the previous constipation into a diarrhœa." In certain conditions of the system, dependent, probably, on malarious influence, the function of the liver appears to be altogether suspended, when, according to Dr. M., a severer form of enteric irritation ensues, succeeded by "ulcerative inflammation," and constituting the most common type of *acute dysentery*.

During these temporary suspensions of the function of the liver, it is presumed that the kidneys act in a subsidiary way—removing from the blood, in a proximate or remote form, or in both, those elements that the liver has failed to convert into bile, and which, therefore, will accumulate in the blood. Should, however, whilst the function of the liver is thus suspended, the action of the kidneys be from any cause simultaneously arrested, according to Dr. M., *cholera* will then be necessarily produced.

These four affections constitute what our author has been pleased to denominate "*acholic diseases*."

In respect to the pathology of *jaundice* as announced by Dr. M. a very correct idea will be derived from the following sentences.

As already remarked, he has assumed that the various glands with which the assimilative portion of the digestive tube is studded are probably subsidiary to the liver; perhaps, some or all of them are rudimentary hepatic acini, but having their functions somewhat modified by their different position, and their different relation to the great source of bile, the portal system. Although from their structure and position these glands may be supposed, Dr. M. remarks, to be the only organs endowed with the vicarious or subsidiary office of secreting a pseudo bile, yet, he asserts, that in nearly every tissue of the body, under exceptional circumstances, bile may be found. Yet he would not say that the several tissues have special bile secreting powers. It is more probable that the hepatic bile—bile secreted by the liver—not finding a free passage into the duodenum is conveyed into the general circulation, and distributed throughout the tissues by exosmosis; and being bland and unirritating its presence there is unproductive of injury. Spurious or factitious bile, however, deposited in any portion of the body has, Dr. M. infers, like that poured into the intestines, an irritant or other noxious property.

A bilious tinge sometimes pervades the body in cases where it cannot be due

to hepatic or cystic bile, in consequence of the function of the liver having become destroyed by organic or other disease. Here, it is evident, that the constituents of the bile, remote or proximate, must necessarily accumulate in the blood, inducing a condition of "*hyper-cholorization*," as Dr. M. denominates it. This condition may become externally manifest by deposition in the tissues, thus constituting one form of jaundice. But Dr. M. believes that the biliary constituents may remain unseparated from the blood, and by their presence cause diarrhoea, dysentery, or colic. The biliary constituents may even, he supposes, be deposited in the tissues without being evident to sight. We may thus have all the conditions of jaundice without the colour, which is probably the case, he thinks, in some forms of diarrhoea, dysentery, and cholera.

"Thus," says Dr. M., "there appears to arise a natural distinction of all forms of jaundice into two great classes: one in which bile has been duly secreted by the liver, and subsequently distributed throughout the body, instead of being poured into the duodenum; another, in which the biliary constituents have not been combined by the liver, and consequently pass on into the general circulation in some abnormal and highly morbid condition. This latter is a state of '*acholia*,' and acholia produces '*cholami*,' poisoning, just as anuria produces uræmic poisoning."

The pathology of *cholera* advocated by Dr. M. will be understood by a perusal of the "argument" prefixed to his chapter on that disease.

"Cholera is an imponderable matter, or condition of matter; tellurian in its origin; existent in and with the atmosphere, but forming no component part of it, being of it as independent as are the rays of light; attracted by some other matter or condition of matter, existent in and peculiar to the human body. Where a great space, as a continent or arm of the sea, intervenes, the earth itself may become the conducting medium."

"When present, that is, in the atmosphere or supra-tellurian, it is attracted, and more or less neutralized, by every, even the healthiest, human body. In certain states, however, of the body, varying from health, the force of attraction is stronger, and the process of neutralization, also, more active and conspicuous. So long as the vital powers are sufficient to keep up this process of neutralization, and so preserve an equilibrium, the system is not overcome by the disease. But under unfavourable conditions, the powers of life are not adequate to carry on, through the lungs, a continuous process of neutralization. The poison is then, of necessity, conveyed through the lungs into the blood. Being there, a far more energetic process for its neutralization is required. A violent convulsion of nature ensues, and the symptoms of '*cholera*' are produced."

A work built up, like that before us, of hypotheses piled upon hypotheses scarcely requires any comment. If it be replete with truth, we shall wait contentedly until those truths be proven.

D. F. C.

ART. XXVII.—*On Cancer: its Causes and Counterfeits*. By THOMAS WEEDEN COOKE, Surgeon to the Cancer Hospital and to the Royal Free Hospital, late President of the Harveian Society of London, Orator for the year 1866 to the Medical Society of London, etc. etc. 8vo. pp. 226. London: Longmans, Green & Co., 1865.

This work is one of great value, from its affording useful aid to the practitioner in the diagnosis and treatment of cases which subject him continually to much trouble and anxiety. The author has studied for more than twenty years, under very favourable advantages, cases of cancer, and he presents here the results of his observations. As a practical treatise on the diagnosis and treatment of cases of cancer we can warmly praise it. The author is an accurate and minute observer; he describes clearly what he has seen, and the text is aided by very appropriate and well-executed illustrations. He abounds in resources for combating symptoms and conditions.

It is as a practical treatise alone, however, that we regard this work of value. The author's theoretical views as to the nature and cause of cancer are not only unproven, but, probably, unsusceptible of proof.

"Cancer," Mr. C. says, "is the quaint term applied to a growth which is alien to the natural tissues of the body, and does not undergo those morphological changes which belong to the healthy structures of men." This definition, is irreconcilable with Mr. Cooke's own theory of the nature of cancer, namely: "that it is no new heterogeneous substance which is deposited among the healthy tissues, but an alteration only of the natural cell-growth or germinating material, which has lost its power of forming healthy structure." (p. vii.)

W. F. A.

ART. XXVIII.—*On Winter Cough, Catarrh, Bronchitis, Emphysema; with an Appendix on Some Principles of Diet in Disease.* A Course of Lectures delivered at the Royal Infirmary for Diseases of the Chest. By HORACE DOBELL, M. D., etc. 12mo. pp. 184. London: J. Churchill & Sons, 1866.

In the pathology of the diseases inscribed on the title-page of the work before us, as laid down by Dr. Dobell, there is very little to criticize, nor is much fault to be found with his account of their therapeutical management. But we do most pointedly object to the name he has adopted—"Winter cough,"—merely because this "expresses the one conspicuous symptom common to them all." We object also to erecting into a new disease—morbid conditions which have little in common save a cough, that is especially prominent in the winter season.

The cases comprised under the name Winter cough Dr. B. arranges into five clinical groups, namely: 1. Cases marked by the physical signs of emphysema, with an absence of those of bronchitis; of the previous presence of which affection there is no history. 2. Cases attended by the physical signs of emphysema, but not of bronchitis, but having a history of the previous presence of the latter disease. 3. Cases in which there are physical signs of bronchitis, but not of emphysema. 4. Cases in which there are physical signs of emphysema and of bronchitis. 5. Exceptional cases, in which there are no physical signs of either bronchitis or emphysema.

It is evident that in the study of the general pathology and therapeutics of the diseases of the respiratory organs, we acquire the necessary knowledge of the nature and phenomena of the affections grouped together under the denomination of "Winter" cough; there was scarcely needed any treatise appropriated exclusively to their consideration.

D. F. C.

ART. XXIX.—*A Handy-Book of Ophthalmic Surgery for the use of Practitioners.* By JOHN Z. LAURENCE, F. R. C. S., M. B. (Univ. Lond.), Surgeon to the Ophthalmic Hospital, Southwark, &c. &c. &c., and ROBERT C. MOON, House Surgeon to the Ophthalmic Hospital, Southwark. With numerous illustrations. 8vo. pp. 191. Philadelphia: Henry C. Lea, 1866.

THERE is no department of medicine in which greater and more important advances have been made within the last few years than in Ophthalmology. The employment of the ophthalmoscope has invested the diagnosis of various affections of the eye with the same precision and certainty that the stethoscope has effected in the diseases of the lungs; and many cases are now successfully treated which would formerly either have been erroneously managed or abandoned as hopeless; and in others the patient is saved from the infliction of useless medical or surgical procedures. The recent scientific researches of Donders and others into the anomalies of refraction and accommodation, the means of

determining them, and the measures for remedying them, has also opened an extensive field, the cultivation of which has yielded a profitable harvest.

The aim of the authors of the volume under notice is "to bring the principles and practice of modern ophthalmic surgery within a small compass, to supply the wants of the busy practitioner, who may have neither time nor opportunity to read the innumerable contributions that ophthalmic surgery and science have received within the last fifteen years."

This object the authors have accomplished in a highly satisfactory manner, and we know of no work we can more highly recommend to the "busy practitioner," who wishes to make himself acquainted with the recent improvements in ophthalmic science. In some few instances, however, we have to express the fear that in the aim to be brief, so as to adapt the book to the wants of the general practitioner, important practical points are sometimes passed over in too cursory a manner, and therapeutical measures enumerated, as practised, without comment, which should only have been mentioned to be reprobated. Thus it is stated "inoculation of the conjunctiva with the pus of ophthalmia neonatorum, or the removal of the ocular conjunctiva, have also been extensively practised in obstinate cases of granular lids." These measures, we conceive, should not have been mentioned unless to be denounced as unscientific, barbarous, and ineffectual.

There is one other point to which we would draw attention: it is in regard to the treatment of obstructions of the nasal duct. "The first step," say our authors, "is to slit up the canaliculus (generally the lower one). Thus, as first shown by Mr. Bowman, we are enabled to introduce probes of considerable size into the sac."

This first step we deem entirely unnecessary, the canaliculi being as readily dilatable as any other portion of the lachrymal passage, and by patience and taking a little time, a sufficiently large probe to gain the desired end may be introduced through them to dilate any stricture in the nasal duct. We speak confidently on this point from an experience of forty years in this mode of treatment.

The only case in which the slitting up of the canaliculus is advisable is where the punctum is everted or obliterated.

The chapter on the ophthalmoscope, with directions for its use, is excellent, as are also the chapters on vision and the optical defects of vision. The authors have evidently studied these subjects thoroughly, and the chapters devoted to their consideration cannot be read without profit. The student will find condensed within a small space a most clear and instructive account of the results of recent investigations in regard to these subjects. Such a work as this was much wanted at this time, and this want Messrs. Lawrence and Moon have now well supplied.

ART. XXX.—*An Introduction to Practical Chemistry, including Analysis.*
By JOHN E. BOWMAN, F. C. S. Edited by CHARLES L. BLOOM, F. C. S.
Fourth American from the fifth revised London edition. 12mo. pp. 351.
Philadelphia: Henry C. Lea. 1866.

This very useful work has been noticed heretofore when former editions have been presented to the attention of American chemists, and has won for itself sufficient acceptance to insure the success of each successive issue. The present volume claims for itself an additional appreciation not entirely founded on previous merit, but because it has in part undergone a thorough revision and rearrangement calculated to render the methods of examination more easily understood, and to facilitate the progress of the learner in acquiring dexterity in chemical practice. The first alteration which strikes the attention and upon which there is much room for difference of opinion, is the entire omission of the symbols representing a chemical compound, and consequently the formula expressive of the reactions which take place in the processes under consideration. The followers of the unitary system of notation seem to have multiplied to such an extent among those for whom this Introduction is more especially in-

tended, that the author or editor felt himself compelled to adapt the notation to this view, by which the formula adopted "would have been comparatively unintelligible to those students who had been accustomed to the older system," or entirely omit this feature in the present volume. To those who cannot yet perceive that this system will live longer than others which have risen into notoriety to lapse into forgetfulness, the decision to omit must be acknowledged to appear the better judgment, and this more especially as it is to be presumed that the student previous to his entering on a course of study of practical chemistry, will have acquired elementary instruction in theoretical chemistry sufficient to construct for himself notation and formula according as he may prefer the binary or unitary system.

The alterations and additions to the practical part of the work are calculated to meet with approbation. Among these may be noted the arrangement of the blowpipe tests systematically together under the different metals, placed in alphabetical order, instead of being scattered throughout the work. To the beginner, this is very advantageous, as in many instances the blowpipe essays give very important hints, and the facility which this plan gives of comparison, will lead to its more extended use, than when there is delay or difficulty in seeking it out in scattered parts. The different processes of investigation are in some instances improved by the more specific directions which are given as to the mode in which they are to be conducted, and attention to the directions cannot fail to insure accuracy in the results. The most important change is in the third part, the qualitative analysis of substances of unknown composition. This part has been entirely rewritten, and presents but little of its former appearance. The principle of discrimination by exclusion is here carried out to its full extent, and the operator is led on step by step from a wide range of probabilities, down to the actual substances present without danger, with ordinary care, of overlooking or missing any of the ingredients. This plan would appear to be, and to the practised operator is in most instances, too tedious and fraught with waste of time to be universally adopted, but for the commencing student is one in the highest degree instructive, and to be followed out in all its detail until experience has sufficiently formed the judgment when more direct methods may be pursued. The reactions by which various compounds may be detected have been extended so as to embrace acids (tannic, gallic) and alkalies (cinchonia, morphia, quinia, strychnia) which have not obtained a place in former editions, and examples for analysis have been added of an instructive character when properly conducted. In regard to the general arrangements, there has been but little alteration, except in classifying the different substances according to their reactions with sulphuretted hydrogen, &c., the order being reversed, commencing with those bodies most easily affected by this reagent, and ending with those exhibiting no peculiar effects, the general effect of the reagent being specified in the heading of each class, and not again repeated under each substance. In addition, there is no division of bodies according to the kingdom from which they are derived, but the organic and inorganic substance follow each other without any definite separation. Other alterations of a minor character are scattered throughout the work, but those above noticed are the most important and sufficient to exhibit the modifications of plan and practice which the author and editor have deemed necessary to make in this publication. This American edition is similar in size and appearance with those formerly issued, and is of a convenient size for consultation and handling.

R. B.

ART. XXXI.—*Clinical Observations on Functional Nervous Disorders.* By C. HANDFIELD JONES, M. B. Cantab.; F. R. C. P., Lond.; F. R. S.; Physician to St. Mary's Hospital. 8vo. pp. 348. Philadelphia: Henry C. Lea. 1867.

THE disorders of which Dr. Jones treats under the denomination "functional nervous," include a very large class of ailments, most of which are of everyday occurrence. Among them will be found a number of which the true patho-

logical character is as yet but imperfectly understood, while their treatment is consequently uncertain, or at best merely tentative. For the proper study of the entire list of "nervous disorders" the author of the present treatise—already favourably known as a careful medical observer—has had ample opportunities, which he has, it must be admitted, faithfully improved. Of his clinical observations and experience, the work before us is, strictly speaking, a faithful record. The points which he esteems to have most bearing on practice, are chiefly the recognition of primary paresis (palsy) of nervous centres, and its distinction from reflex paralysis; the numerous illustrations of va-o-motor nerve disorders; the theory of inhibitory action; the remarkable affinity existing between paralysis, spasm, anaesthesia, and neuralgia; the different quality of nervous disorder, apparently of the same kind in different instances; the intimate relation of neuralgia, in most instances to debility, and the importance of an accurate adjustment of remedies to each individual case of disease.

We most heartily agree with Dr. J. as to the deep interest and importance of the several points above indicated. They are all of them ably exposed by him.

Taken as a whole, the work before us furnishes a short but reliable account of the pathology and treatment of a class of very common but certainly highly obscure disorders. The advanced student will find it a rich mine of valuable facts, while the medical practitioner will derive from it many a suggestive hint to aid him in the diagnosis of "nervous cases," and in determining the true indications for their amelioration or cure.

D. F. C.

ART. XXXII.—*A Practical Treatise on Diseases of the Skin.* By J. NELIGAN, M. D., etc. Fifth American from the second revised and enlarged Dublin edition. By T. W. BELCHER, M. A., M. D., Dub., etc., etc., etc. *Ratione et Experientia.* 12mo. pp. 462. Philadelphia, 1866; H. C. Lea.

THIS edition of Dr. Neligan's well-known treatise has been published since the author's death, under the editorial supervision of Dr. Belcher, a former pupil of the deceased author, and now physician to the Dublin Dispensary for skin diseases. The editor has very faithfully performed his task, having brought up to the present time the account given in the treatise of a most important but little understood class of maladies. It is true, as Dr. B. remarks, that, since the appearance in 1852 of the first edition of Dr. N.'s treatise, "a great change has taken place in the relation of *dermatology* to medicine. Numerous works of value have been published; important discoveries have been made, and papers without number on isolated cases, or classes of skin disease, have continually issued from the medical press. Thus the subject has taken a high professional rank, and has been completely rescued from the shade under which it had fallen, from its having been made a ready means of ill-gotten gain by the quack and the impostor."

To the text of the first edition, which has undergone a careful revision, have been added the discoveries made since its appearance, and the opinions advanced by recognized authorities, as to the causation, nature, and treatment of cutaneous affections; with the result of the experience of the editor whether it particularly confirmed or differed from that of Dr. Neligan.

Considerable additions have been made by Dr. Belcher to the first chapter on classification; chiefly as regards the modern nosologies of Hardy, Hebra, Buchanan, and others. He has also added derivations and meanings of technical terms, with their synonyms. References to Dr. Neligan's *Atlas of Cutaneous Diseases*, as also to the plates of Cazenave and Hebra. References to Macnamara's sixth edition of Dr. Neligan's *Materia Medica*. Quotations from and references to authorities in every case, particularly where the full description of the subject is excluded by reason of the concise method of the work. Explanations of the peculiar modes of treatment, and, in some cases, the prescriptions of the best English and foreign dermatologists. Translations are given throughout of the prescriptions embraced in the work, into the technical language of

the British Pharmacopœia. A *posological* table is added of the most important, and mostly poisonous remedies used in the treatment of cutaneous diseases; together with a copious table of contents, and a bibliographical index of the leading authorities adduced.

Notices of the following, among other cutaneous diseases, occur for the first time in the present edition: namely—rubeola, scarlatina, variola and its allies; furunculus, anthrax, pustula maligna, lepra hebraeorum, elephantiasis, morphea, frambœsia, morbus tauricus, Aleppo evil, ngerengere, pellagra, morbus Addisonii.

Considerable additions have been made to the chapter on parasitic diseases, or dermatophytæ, and also to the chapters on diseases of the hair and nails, and to that on therapeutics.

The general index is very full, and comprises the cutaneo-nosological synonyms used by ancient and modern writers in England and other countries. Although the account given in this work of the different cutaneous diseases is a very concise one, a bare outline, it is, nevertheless, very uniformly clear and accurate, furnishing a fair exposition of the present condition of the knowledge and experience of our profession in respect to the pathology and management of these affections. From it the student will gain such preliminary instruction as will enable him to profit by the study of the more extended treatises and monographs on skin diseases that have or may appear, while the practitioner is directed to those sources from whence he may acquire reliable information on these affections, generally, or any one of them which may from any cause at the time claim his attention.

D. F. C.

ART. XXXIII.—*Practical Therapeutics, considered chiefly with reference to Articles of the Materia Medica.* By EDWARD JOHN WARING, F. R. C. S., F. L. S., Surgeon in her Majesty's Indian Army. From the second London edition. 8vo. pp. 815. Philadelphia: Lindsay & Blakiston, 1866.

MR. WARING has produced a book which entitles him to the thanks of students, as well as of all who need a work on therapeutics, in which each item is very briefly and authoritatively described. An index of diseases, in which will be found indicated the medicines which have been used or are applicable to each affection named, and also an index of medicines, &c., in addition to the alphabetical arrangement of the whole text, render reference to the volume easy and satisfactory.

The work is divided into an introduction, in which the art of prescribing medicines, their doses at different ages, and under various circumstances, are briefly considered; a first part, in which the articles of the materia medica, alphabetically arranged, are treated of chiefly in reference to their supposed curative properties in an empirical sense, and a second part, in which the therapeutic qualities of classes of medicines, as stimulants, &c., as well as the curative influence of certain remedies, as bathing, electricity, &c., also alphabetically arranged, are discussed.

Mr. Waring's mode of treating each article may be understood from the following extract, selected because it is short:—

“300. *APIOL. APIOLUM.* A peculiar principle of the seeds of *Petroselinum sativum*, or Common Parsley, obtained by treating them with alcohol at 158° to 176° F. It occurs in the form of a yellowish oily liquid, and with an odour somewhat resembling the powdered seeds, and an acrid, piquant taste. It is soluble in alcohol, ether, and chloroform.

“*Med. Prop. and Action.* Tonic, anti-periodic and emmenagogue. Joret and Homolle found that, when taken in doses of gutt. viij–xv, it occasioned slight cerebral excitement, similar to that produced by coffee, together with epigastric warmth. In doses of ʒss–fʒj, it caused vertigo, tinnitus aurium, headache, &c., similar to the effects produced by a strong dose of Quinine. Occasionally, its use was followed by nausea, colic, and bilious diarrhœa.

“*Dose*, gutt. viij–xv in syrup.

"301. *Therapeutic Uses. In Intermittent Fevers*, the value of Apiol has been examined by Joret and Homolle. Of 43 cases of all types, collected from various parts of France, 37 were cured, and in the remaining 6 the fever was modified, but not removed. Of 39 cases occurring in hot climates, only 15 were cured. From these facts, it is concluded that, if Apiol be not of equal value to Quinine in the intermittents of hot climates, it may yet be very well substituted for it in indigenous, *i. e.*, European, intermittents; other facts in favour of this remedy are adduced by M. Joret. Dr. Jacquot, however, subjected it to a trial in the military hospitals at Rome, and expresses great doubt as to its efficacy, only one case in six yielding completely to the remedy. It apparently deserves to be classed amongst those minor remedies which often prove successful in mild cases of intermittents. The usual dose is grtt. xv, gradually increased. In *Intermittent Neuralgia* and in the *Night Sweats of Phthisis*, Joret and Homolle consider that this remedy is likely to prove serviceable.

"302. *In Amenorrhœa and Dysmenorrhœa*, Apiol, according to Dr. Joret, is one of the safest and best emmenagogues which can be employed, not being contraindicated even in cases of pregnancy. It is thought to be especially adapted for these states when they arise from a diminution or excess or perversion of the vitality of the uterus, attended with local or general nervous symptoms. To be effectual, it requires to be administered at those periods when the menstrual discharge would be naturally expected to return, and to be continued five or six successive days. A dose should be taken night and morning."

Mr. Waring's volume implies very extensive reading and pains-taking industry in its preparation. It seems to be compiled up to the day of publication, and may be regarded to be an excellent summary exposition of what is at present known about the therapeutic properties of medicines. We commend it to the attention of the profession.

W. S. W. R.

ART. XXXIV.—*A Manual of Medical Jurisprudence*. By ALFRED SWAINE TAYLOR, M. D., F. R. S., F. R. C. P., and Prof. of Medical Jurisprudence and Chemistry in Guy's Hospital. Sixth American edition from the eighth and revised London edition, with notes and references to American decisions. By CLEMENT B. PENROSE, of the Philadelphia Bar. pp. 776. Philadelphia: Henry C. Lea, 1866.

This manual of Professor Taylor's is so well known, and its value so fully appreciated, as shown by its having gone to an eighth edition in England and to a sixth in this country, that it would be a work of supererogation to discuss now its general merits. It will be sufficient at this time to indicate the more important improvements made in the present edition.

For the information and guidance of medical men the author has introduced two chapters on evidence and on the duties and responsibilities of medical witnesses, and also some medico-legal subjects not treated of in previous editions. Numerous engravings representing the crystalline forms of poisons and the apparatus for their detection, have likewise been added.

The American editor has restored some parts omitted by the author in the last London edition, and also introduced from Professor Taylor's other work, *The Principles and Practice of Medical Jurisprudence*, some important articles on noxious animal food, trichiniasis, sexual malformations, insanity as affecting civil responsibility, suicidal mania and suicide, life insurance, &c. He has retained the notes of the former American editor, Dr. E. Hartshorne, and added numerous references to American practice, and decisions thus rendering the American far more comprehensive and valuable than the English edition, and making it a most complete and convenient guide in medico-legal practice.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Epithelium of Air-Vesicles*.—Dr. C. O. WEBER says that there is no doubt of the existence of this epithelium, at least in the fœtus. In a fœtus four months old it may be easily isolated from a pulmonary vesicle in the form of a small spherical mass.—*Gaz. Méd. de Paris*, June 16, 1866, from *Virchow's Archiv*.

2. *Structure of the Kidney*.—M. CHRZONSCZEWSKY combats Henle's ideas on the structure of the kidney. He injects carmine of ammonia into the jugular vein of a rabbit; the carmine passes into the vessels and thence into the uriniferous tubes and the urine. To colour the vessels alone, he ties the renal veins immediately after injecting the jugular, then the artery; to colour the uriniferous tubes only, he ties the ureter and injects through the renal artery a saline solution, which removes all the colouring matter deposited in the vessels of the kidney. The principal results at which he had arrived are the following: The uriniferous tubes end in three ways: in anastomoses, in *culs-de-sac*, and in Malpighian corpuscles. The anastomoses, which are very numerous in man, in the calf, and in the pig, are met with chiefly in the cortical substance. The termination in *cul-de-sac* is very rare; but there is no doubt of its existence. The Malpighian corpuscles (or rather capsules) are continuous with the tortuous tubes alone, and each with only one. The Malpighian capsule is lined with pavement-epithelium; the internal surface of the glomerulus of vessels is also covered with epithelium, but of larger cubic cells, more resembling the tortuous tubes. The Malpighian capsules communicate with the flexuous tubes, and through them with the straight tubes; and all may be injected through the ureter. In the looped canals described by Henle two kinds are to be distinguished: 1. Some described already by Ferrein, found in the peripheral portion of the medullary substance, are merely loops of flexuous tubes burying themselves in this substance. 2. Others, reaching the summits of the pyramids, are merely vessels.—*Gaz. Méd. de Paris*, June 16, 1866, from *Virchow's Archiv*.

3. *Alteration of Organic Structure by Congelation*.—In a paper on the congelation of animals by Dr. DAVY, in which the author arrives at the almost self-evident conclusion that perfect congelation is antagonistic to life, he refers to the alteration of structure from the same cause. Muscle, according to Dr. Davy, after having been frozen, showed a well-marked difference under the microscope. When thawed the striated structure was no longer visible, and after a few hours—viz., on the following morning—whilst the unfrozen muscles had undergone no perceptible alteration, those which had been frozen had become of increased tenderness, yielding to a slight rending force, and breaking

short, as if the coherence of the particles forming the fasciculi was greatly diminished.—*Med. Press and Circular*, Nov. 21, 1866.

4. *Myographion*.—Dr. WM. RUTHERFORD, of Edinburgh, gave a description to the British Medical Association of a most ingenious instrument—Du Bois Reymond's Myographion; and performed with it the remarkable experiment devised by Helmholtz to measure the rapidity of nerve-force. He described the instrument as consisting of three principal parts: 1. A glass cylinder turned by clockwork, having a dial by which the rate of the cylinder's revolution may be ascertained with the greatest precision. Before each experiment, the cylinder is smoked, and so permits the point of a stilette to make a tracing upon it. 2. Arrangements for fixing the gastrocnemius and sciatic nerve of a frog, and for connecting the muscle with the stilette. The femoral extremity of the muscle is secured by a pair of forceps; and the tendo-Achillis is connected by hooks with a movable beam, having at its one extremity a stilette. When the muscle contracts, the beam is raised; and the stilette, being in contact with the cylinder, produces a tracing corresponding to the contraction of the muscle. The muscle and nerve are surrounded by a glass case containing wet blotting-paper, to prevent the tissues from becoming dry. 3. Arrangements by which the nerve is irritated, and the muscle thereby thrown into action at a given point of time. The nerve is irritated by breaking a constant electrical current sent through it. Two pairs of wires are placed in contact with the nerve; one pair as near the entrance of the nerve into the muscle as possible, and the other at a point of nerve about two inches from the muscle. The wires are connected with a simple contrivance called an inverter, by means of which the current from a battery and galvanic machine can be sent through one pair of wires in contact with the nerve or the other; the object of the experiment being to ascertain how long the nerve-force takes to pass from the point of nerve over the one pair of wires to that over the other. The part of the instrument by which the electrical current is broken, and irritation of the nerve thereby produced at a given moment, consists of a round brass box, fixed to the axle of the cylinder, and rotating with it. The box contains a movable weight; and as it revolves, the weight, from centrifugal force, moves outwards; and, when it had reached a certain point, it suddenly breaks the electric circuit, and so throws the muscle into action. By means of the dial upon the clockwork, the rate of the cylinder's revolution, just when the current is broken, can be accurately ascertained; and, by means of a spiral spring attached to the weight in the brass box, the rapidity with which the weight moves outwards may be regulated, and so we can have the current broken when the cylinder revolves ten times or fifteen times in a second, and so on.

The experiment was begun by counting the velocity of the cylinder when the current was broken. It was found to be exactly fifteen revolutions in a second; the circumference of the cylinder being six inches— $6 \times 15 = 90$ inches linear of surface of cylinder—equal to a second of time. The cylinder was then blackened by means of turpentine smoke. The gastrocnemius and sciatic nerve of a frog were dissected out and attached in the manner above indicated; the electrical current was sent through the nerve close to the muscle, and the clockwork set in motion. When contraction had taken place, the instrument was stopped and re-arranged; the current was then sent through the portion of nerve two inches from the muscle, and the clockwork again set in motion, and stopped when the muscle had contracted. The cylinder was then rolled along a moistened sheet of gelatine, and an impression taken from it. It was then found that the commencement of the tracing produced after irritating the nerve two inches from the muscle was one-fifth of an inch distant horizontally from the commencement of that which had followed irritation of the nerve near the muscle. The nerve-force had taken an interval of time equivalent to the one-fifth of an inch of the cylinder's surface to pass from the point of nerve over the one pair of wires to that over the other; that distance was two inches. The next point was to find the value in time of the one-fifth of an inch. Ninety inches of the cylinder's surface corresponding to one second, one fifth of an inch would, of course, be equivalent to 1-450th of a second. If it took 1-450th of a

second to travel two inches, how long would it take to travel a foot? By simple proportion, it was found to be 1-75th of a second, which is, of course, equal to seventy-five feet per second. This is the usual rate in the frog.

The myographion of Du Bois Reymond is similar to that constructed by Helmholtz; the essential difference consisting in the arrangements for breaking the current at a given moment of time. In Du Bois Reymond's, this is effected with greater simplicity and precision.—*British Med. Journ.*, Aug. 25, 1866.

MATERIA MEDICA AND GENERAL THERAPEUTICS.

5. *Chlorate of Quinia*.—This newly-discovered salt (see No. of this Journal for July, 1866, p. 232), which the profession owes to Dr. Lyons, continues to be employed in his Clinique and in his private practice, we are informed, with most satisfactory results. In cases of scarlatina, typhus, all low pyrexial states, local inflammations, &c., the use of this drug is indicated, and so far as opportunities have yet been afforded for testing its efficacy, the results are reported to be highly favourable. From its chemical constitution and the large amount of available oxygen which is thrown into the system when this medicine is ordered, according to the formula recently furnished,¹ in solution with perchloric acid, valuable therapeutic effects may be anticipated *a priori*. The tonic alkaloid conveyed into the economy at the same time is a very important substitute for the potash in the ordinary salt hitherto employed (chlorate of potash). Dr. Lyons awaits an opportunity of testing the value of the chlorate of quinia in that malady in which, above all others, chlorate of potash has attained, according to Trousseau and Pidoux, its most important and indisputable triumph—namely, gangrenous stomatitis. Meanwhile he invites the co-operation of his professional brethren in testing the value of this hitherto unused salt.—*Medical Press and Circular*, June 20, 1866.

6. *Syrup of the Phosphates of Iron, Quinia and Strychnia*.—Dr. Lyons has for some time past employed with, he conceives, very important therapeutic results, this powerful tonic combination, for which the profession is mainly indebted to the late Dr. Eaton, of Glasgow, and Professor Aitken, of the Royal Victoria Hospital, Netley.

The concentrated syrup of the phosphates, when made by double decomposition, according to Professor Aitken's formula, contains per drachm two grains of the phosphate of iron, one grain of the phosphate of quinia, and one thirty-second of a grain of the phosphate of strychnia. It is a perfectly clear and limpid fluid, slightly refracting light with the peculiar tint of the quinia solutions, and viewed in mass, obliquely showing the bluish tint of the phosphate of iron held in solution. It is perfectly miscible with distilled water, has a strong styptic and distinctly chalybeate taste, and an aftertaste of quinia. It may be exhibited in doses of twenty to forty, and even sixty, minims, diluted with water, according to age and the circumstances of the case. It is well borne in the majority of cases; it acts as an invigorating stomachic and sensibly improves appetite; it is an admirable general tonic; it appears to be a readily assimilable chalybeate, and is thus well adapted for certain chlorotic and anæmic states. In the morbid states of the nervous system which precede and accompany the development of the strumous diathesis, the influence of the strychnia salt appears to be exercised with great potency as a nervine tonic and stimulant, and it would seem to be an important agent in altering the morbid state of the nervous apparatus which presides over the function of nutrient assimilation. Physiologically, this influence may be supposed to be attributable to the well-known action of the strychnia salts on the spinal cord, as well as by direct stimulus to the filaments of the great sympathetic plexuses distributed

¹ See this Journal, July, 1866, p. 232.

to the stomach and intestines. From the general tonic and invigorating effect of this drug, its influence on the stomach and the promotion of appetite, as well as by the improved assimilation of food which it induces, it is a very valuable medicine in cases of strumous children threatened with scrofulous degeneration and ultimately with localized tubercular development. As a preparative to the use of cod-liver oil, and in certain cases as a concomitant to this food-substitute, the syrup of the three phosphates will be found a very important adjunct in the treatment of numerous forms of strumous disease.

But the employment of this admirable combination is not limited to the cases just mentioned. In depressed states of the system in the adult and the aged, in several of the conditions tending to adipose degeneration of important organs, such as the heart and kidneys, the syrup of the phosphates will be found a serviceable and reliable remedy. Where it is desired to combine a tonic and styptic to aid in checking the drain of albumen from the system in chronic disease of the kidneys, this combination will be found of great use.

In many forms of cutaneous diseases where a tonic effect is desired, this combination will be employed with benefit.

For the use of strychnia in chorea and certain other of the maladies of children, the high authority of Troussseau and Pidoux may be cited. These distinguished authors give the following formula for the preparation of a syrup of strychnia. Five centigrammes of the sulphate of strychnia are dissolved in one hundred grammes of simple syrup. One hundred grammes contain about twenty-five *cuillerées à café* or teaspoonful; each teaspoonful or drachm contains two milligrammes or one twenty-fifth of a grain of the sulphate of strychnia. Dr. Lyons is of opinion that a superior efficacy will be found to attach to the triple combination above described. His best thanks are tendered to the Army Medical authorities in this city, by whose kindness Sergeant Moss of the Army Medical Stores, himself an experienced practical chemist, and who had learned the process under Dr. Aitken's supervision, has been allowed to prepare for him a specimen of the syrup of the phosphates of iron, quinia, and strychnia in exact accordance with Professor Aitken's directions.—*Medical Press and Circular*, June 20, 1866.

7. *Jurubeba (Solanum paniculatum)*.—A naturalist of Pernambuco has made some experiments with this plant, and found it to possess such extraordinary properties that he thinks it would be useful to introduce the plant into European practice; and already at Pernambuco a plaster, a powder, a syrup, a wine, a tincture, a watery and alcoholic extract, an electuary, and an oil are prepared with this substance, which is employed in all cases of intermittent fevers, liver complaint, splenic affections, catarrh of the bladder, anæmia, chlorosis, dropsy, and difficult menstruation; and it is said to be the most energetic tonic and deobstruent in the materia medica. The jurubeba will be presented to commerce in the forms of leaves, fruits, and roots. The bark of the root and the leaves have a well-marked bitter taste. The root, when treated with water or alcohol, furnishes a bitter extract, which is more abundant in the cortical than in the woody part of the root. *Bulletin of Foreign Medical-Chirurgical Review*, Oct. 1866, from *Bulletin Général de Thérapeutique*, Jan. 15, 1866.

8. *Therapeutical Uses of Narceina*.—The sleep produced by narceina differs, according to M. Bernard, from that of morphia by its tranquillity and the absence of snoring, as well as by the waking which follows its use; neither paralysis nor disturbance of the intellect is observed, such as always follows the torpor of morphia, and animals return much more quickly to their normal state than after the use of morphia. The publication of the above views by M. Bernard induced M. EULENBURG to make frequent use of narceina, especially in surgical cases, and even on persons in health. It may be used either internally or externally. The last method, by subcutaneous injection, has been proved to be preferable by the certainty of the effects produced and by the smallness of the doses required. M. Eulenburg employs for this purpose a solution of hydrochlorate of narceina, containing from the eighth to the fourth of a grain; but for internal use he employs from the sixth to the half of a grain. In healthy per-

sions these doses have been generally followed by a slight narcotic effect, without headache or gastric derangement. Among the physiological effects of narceina, in addition to narcotism, is its action on the circulation, consisting in a diminution of the pulse, succeeded by acceleration. M. Eulenburg considers it superior to all other substances in its sedative and hypnotic effects, and that its employment is indicated in articular affections, phlegmons, lesions of the eye (as iritis), orchitis, cystitis, and after painful operations. In all such cases, when given in the above-mentioned doses, either internally or externally, it rapidly relieves pain and produces a gentle sleep. Among the cases published by M. Eulenburg there were several in which morphia produced only a negative or insufficient result, in consequence of want of tolerance or of some other cause, and in which narceina acted in a most satisfactory manner. He has hitherto had but few opportunities of employing narceina in neuralgia: but when he has done so, rapid improvement has followed its use.—*Ibid.*, from *Bulletin Général de Thérapeutique*, May 30, 1865.

9. *Influence of Alcohol on the Temperature of Non-febrile and Febrile Persons.*—Drs. SYDNEY RINGER and WALTER RICKARDS in a paper read before the Royal Med. and Chirurgical Society (June 26), gave the results of some observations on the influence of alcohol on the temperature of non-febrile and febrile persons, and a few on rabbits. The authors gave alcohol in poisonous doses to three non-febrile adults. The temperature was greatly depressed in two. The depression amounted to 3° Fahr. In the third case the temperature was but little influenced. The subject of this observation was a confirmed drunkard. He confessed to getting drunk whenever he had the opportunity. Alcohol was also injected into the rectum of two rabbits. In both the temperature was considerably depressed. The depression amounted to 15° Fahr. The authors, therefore, concluded that alcohol in poisonous doses causes a very considerable depression of the temperature of the body of non-febrile persons, and also that it is probable that habit obviates this effect. Further proof in favour of this latter conclusion is given in a subsequent part of the paper. The rapidity of the fall of the temperature after death of two patients and one rabbit was ascertained. This is compared with the rapidity of the fall of the temperature after the use of alcohol. It was found that the temperature falls as rapidly after the use of alcohol in poisonous doses as after death. The circumstances determining the cooling of the body, however, differ in the two conditions. Thus during life much heat is carried off by the air inspired into the lungs. Assuming that the cooling effects of respiration are equal to those that result from radiation from the surface of the body, it follows that alcohol possesses the power to diminish by one-half those processes that produce the heat of the body. Both of the patients whose temperature was depressed suffered from nausea and vomiting. In order to ascertain if the depression of the temperature were due to the conditions that accompany vomiting, tartar emetic was given to a patient every ten minutes, and continued long after vomiting was produced. The administration of the antimony was continued seven hours. No depression of the temperature resulted. Thus the authors conclude that the depression of the temperature was not due to the vomiting produced by the alcohol. Alcohol was next given, in ordinary doses, to non-febrile persons. Eleven observations were made. In eight the temperature was depressed. In three cases the temperature was unaffected. These three persons were strong adults. The quantity of alcohol given them was small (an ounce of brandy). Two of them were confessed free drinkers. The amount of depression was slight. The authors thus conclude that alcohol, when taken in ordinary quantities by non-febrile persons, causes a slight depression of the temperature of the body, but that the amount of depression which occurs is too slight to contraindicate its use. Numerous observations were made to ascertain the influence of alcohol on the temperature of febrile persons. To some of the patients very large quantities of alcohol were given. To a child of 12 years old eleven ounces of absolute alcohol were given on one day. From these observations the conclusion is drawn that ordinary and extraordinary quantities of alcohol cause only a slight and temporary depression of the temperature of febrile persons,

and consequently alcohol cannot bring the temperature of febrile patients to that of health. But if alcohol should be indicated by the general condition of the patient, it will, also, to some extent act beneficially in virtue of its power to cause some diminution of the temperature of the body.

Some observations were made to ascertain the influence of alcohol on the pulse. From these the conclusion is drawn that alcohol increases the force of the pulse, but lessens its frequency.

In conducting these observations the following precautions were taken: the patients were kept in bed; all the conditions were kept the same; the thermometer was kept the whole time in the axilla, and the temperature was noted every few minutes. The observations were continued many hours—in some cases during the entire day.—*Med. Times and Gaz.*, Sept. 29th, 1866.

10. *Application of Carbonic Acid in the Treatment of Diseases of the Urinary Passages.*—M. DÉMARQUAY discusses in a recent work by him on pneumatology the advantage of the exhibition of carbonic acid in diseases of the genito-urinary organs. This gas was employed in the last century chiefly as a solvent of calculi, but it is probable that the beneficial effects observed were due rather to the soda or potash employed in the process of extricating carbonic acid than to the carbonic acid itself. But a more useful and practical application of the medicinal properties of carbonic acid has been made in certain cases of cystitis and vesical neuralgia. Last summer M. Démarquay witnessed a case of vesical neuralgia occurring, without any apparent cause, in a woman aged thirty, and giving rise every day to numerous paroxysms of five or ten minutes' duration. Injections of carbonic acid repeated twice a day induced rapid improvement, so that after four days three paroxysms only occurred in the twenty-four hours, and a cure, but perhaps a temporary one, was effected in a fortnight. In such cases the carbonic acid acts as a special sedative. The vesical douche may be easily administered with a small caoutchouc bag filled with carbonic acid, which is propelled into the bladder through a common catheter. But another and more complicated system exists in the use of an apparatus, known as Mondolot's, and consisting of a double-barrelled tube, which facilitates the escape of any gas in excess from the bladder. The probable utility of carbonic acid as a sedative in some uterine affections characterized by local irritation might be inferred from its known physiological effects. Thus it has been successfully employed in the form of fumigations in amenorrhœa and dysmenorrhœa, and M. Démarquay thinks that in such cases water charged with carbonic acid might be a good substitute for the gas itself. Among the various uterine affections in which M. Démarquay has derived benefit from the carbonic acid douche are chronic enlargements and simple ulceration of the cervix; and the same remedy has succeeded in allaying pain, in checking fetid secretions, and occasionally in healing ulcers. M. Démarquay, however, does not regard carbonic acid as a panacea in the above-mentioned complaints, but thinks it may be of considerable service in certain cases.—*British and Foreign Medical-Chirurgical Review*, Oct. 1866, from *Journal de Médecine et de Chirurgie Pratiques*, Oct. 1865.

11. *Therapeutical Application of the Permanganate of Potash.*—Dr. COSMAO-DUMENEZ, of Finistère, remarks, in the first place, that disinfectants act in three different ways: namely, by preventing the formation of fetid gases, by absorbing them, or by decomposing them; and as permanganate of potash acts in the last-named manner, it holds the first rank, and it is the more valuable as it is itself insipid and inodorous. This substance may be used either in solution or in powder mixed with carbonate of lime or starch, but Dr. Dumenez prefers the solution. He has treated many cases of ulcerated legs, exhaling a fetid smell and presenting a grayish appearance, and two or three dressings with the permanganate were sufficient to remove entirely the bad smell and to restore a roseate colour to the affected tissues. The permanganate, therefore, promotes the cicatrization of wounds, and Dr. Dumenez has often seen this effect to follow its use. The odour from gangrenous wounds disappears with surprising rapidity under the use of the permanganate; and even in cases of cancerous ulceration of the uterus, the use of injections of this salt improves the general

state of the patients by putting them into a better hygienic condition. Ulcerated cancer in other regions may be treated with similar success by lotions or injections. In ozæna and in fetor of the breath the permanganate has been found very useful, and Dr. Dumenez quotes from Dr. Oliffe a case of ozæna thus successfully treated. In the case of morbid secretions it appears to remove from these liquids their septic character, and thus to improve the condition of wounds from which they may emanate. It never produces any bad effect, and when applied on mucous membranes, whatever the dose may be, it produces no pain or irritation. Dr. Dumenez passes in review the various substances which have from time to time been employed as disinfectants, such as acids, chlorine, and the chlorides, pyrogenic oils like that of coal-tar, &c., and he gives the preference to the permanganate of potash over them all.—*British and Foreign Medico-Chirurgical Review*, Oct. 1866, from *Bull. Gén. de Thérap.*, Nov. 30, 1865.

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

12. *Digitalis in the Treatment of Mania, Recent and Chronic.*—Dr. S. W. D. WILLIAMS, in a paper with nineteen illustrative cases, published in the *Journal of Mental Science* (January, 1866), confirms the opinion of Dr. Robertson as to the efficacy of digitalis in certain forms of mania. The cases already published by Dr. Robertson tend to show the almost specific action of digitalis in allaying the excitement of impending general paresis; but the paper of Dr. Williams is confined to illustrating the use of the drug in the excitement accompanying mania in its acute and chronic forms, and also when complicated with epilepsy. The results of the cases show that digitalis seems to possess a marked power of arresting cerebral excitement, of whatever nature it may be; but it is also evident that, except as allaying excitement it has no further curative powers. Dr. Williams considers its efficacy in chronic mania and epilepsy to be simply due to the fact that it lessens the action of the heart, thus diminishing the flow of blood to the brain, and offering less food for the excitement to feed on. This view is rendered more probable from the fact that digitalis never exerts any beneficial influence until after the pulse has been affected; and Dr. Williams has moreover observed that when the system has become used to the potency of the drug, the return of the pulse to its former rate is accompanied by a corresponding exacerbation of excitement, which can only be allayed by increasing the dose. Although it might be supposed that only strong, healthy constitutions would be able to bear the effects of digitalis, this view is incorrect, for patients weakened by disease or exhausted by excitement bear its administration in general better than those who are stronger; and this fact explains its efficacy in general paresis, which is essentially a disease of debility. Dr. Robertson advises the use of doses varying from ʒss to ʒj three or four times a day, under which treatment an excited patient may perhaps at first become more excited than before; but if the medicine is continued, it will be found that the excitement gradually subsides, and the pulse becomes intermittent. When this is the case, the digitalis should be omitted until the pulse has resumed its normal rhythm. As regards epileptics, Dr. Williams thinks that digitalis possesses a certain amount of preventive power, and is able not only to ward off the attacks of violence, but to lessen their force when they occur. One of the patients whose case is recorded by Dr. Williams had taken ʒss of digitalis (tincture) twice daily for many months and with marked benefit, for one of the epileptic relapses passed off without the slightest manifestation of violence. In some cases where digitalis has after a time lost its power, or has caused sickness and vomiting, Dr. Robertson combines it with morphia, tincture of hyoscyamus, and chloric ether. The influence of digitalis on the heart being generally admitted, the question is whether it is a stimulant or depressant; and Dr. Williams inclines to the belief that it is a decided stimulant. The general conclusions drawn by Dr. Williams

as to the use of digitalis in insanity are that it is a valuable sedative both in recent and chronic mania, and when these forms of disease are complicated with general paresis and with epilepsy; that the average dose of the tincture is ʒss to ʒj, to be continued even for many months, unless it causes intermittence of the pulse, when it must be immediately discontinued; that weakness of the circulation is no indication against its employment, but the reverse; and that in certain cases it may be advantageously combined with chloric ether, morphia, and prussic acid.

13. *Capsicum in Delirium Tremens*.—Since our last notice [see this Journal for July, 1866, p. 241] of the employment of this simple and efficacious plan of treatment, some well-marked cases have occurred in Dr. Lyons's practice. In one instance, the patient, a tavern-waiter, of chronically intemperate habits, was admitted to the Whitworth Hospital in the first stage of this morbid condition. The patient exhibited tremor in almost all the muscles of the body, chilliness, debility, sleeplessness, foul tongue, severe and general uneasiness, but there was a total absence of illusions, horrors, or delirium to any degree. He got a single dose of capsicum, twenty grains in a bolus, after which he slept and fully convalesced, the disease having been thus peremptorily cut short. Dr. Lyons remarks on the great importance of this early phase of the disease being recognized and promptly treated. The patient is in that condition in which he may be by but slight further indiscretion plunged suddenly into all the horrors and moral degradation of the state of fully developed delirium tremens, with all its consequent loss of character with others, and loss to the patient himself of that last barrier against utter abandonment, the sense of shame and remorse. For not alone does the first occurrence of delirium tremens brand the sufferer with the character of an all but irretrievable dipsomaniac, but the fact that he has passed this moral Rubicon, in the vast majority of cases deprives the patient of all stimulus to self-control, and under the demoralizing feeling that there is nothing further to be risked, his steps henceforward ever tend downwards and from had lead on to worse.

As Dr. Lyons observes, a brief but variable period often precedes the fully developed attack of delirium tremens, especially in first cases, in which the patient presents anomalous symptoms unintelligible to himself, and not always read aright by his attendant. This stage is in some patients marked by the occurrence of tremor, sleeplessness, and general distress and anxiety, without a trace of delirium. In other instances slight illusions prevail without tremor, from which the patient can by an effort arouse himself, and under strong self-directed exertion of the will even command his faculties for a time, and pursue avocations of business, to break down, it may be, hopelessly, a few hours subsequently, if his condition is neglected, misunderstood, or mistreated. Under these circumstances, the treatment by capsicum comes in very opportunely, and by its employment we may, as in the case just cited, cut short the disease, and so save the patient from the consequences of his imprudence, and possibly restore him to a reformed life. Another case well illustrates the success of this drug when opium had completely failed to alleviate the symptoms, and seemed on the contrary in many respects to aggravate the patient's condition. The case was that of an individual who had taken six grains of opium within a period of two or three days without sleep being procured, or any relief to the illusions, tremor, and distress under which the patient laboured. After a twenty-grain dose of capsicum in bolus, profound and refreshing sleep for twelve hours was induced, and the patient awoke conscious and restored. In an almost precisely similar instance occurring about the same period a thirty-grain dose of the drug had to be given a second time before full relief was procured. In one or two instances of individuals of confirmed and extremely intemperate habits it was found necessary to repeat the dose some three or four times.

As to the physiological action of the remedy, Dr. Lyons's explanation is that already given in a former communication—namely, that it produces a powerful stimulant and sedative influence by its direct action on the gastric filaments of the vagi. Slight uneasiness in the stomach has been complained of in one in-

stance only after its use, and in two instances somewhat smart purgation was noticed, but without any evidence of intestinal or other irritation.

As at present employed, the drug is administered in bolus made up with honey of roses; but Dr. Lyons suggests the feasibility of its being conveyed to the stomach in the more agreeable form of a capsule.

As capsicum belongs to the great order of the Solanaceæ, Dr. Lyons suggests the possibility of its containing a narcotic principle hitherto undiscovered. He has referred this question for further elucidation to his distinguished friend, Mons. Gages, curator of the Museum of Irish Industry, a chemist of great eminence.—*Medical Press and Circular*, June 20, 1866.

14. *Digitalis in Large Doses in the Treatment of Pneumonia.* By Dr. GALLARD.—Among the numerous remedies which have been proposed and are now employed in the treatment of pneumonia, digitalis appears to be particularly indicated in cases where the febrile reaction seems to require the employment of antiphlogistics; but where the debility of the patient, and especially the state of depression into which he has fallen from the commencement of the disease would appear, on the other hand, to require the use of stimulants and tonics. These cases are not rare in practice, and they correspond pretty accurately to the form of pulmonary inflammation described under the name of *typhoid pneumonia*, and it is in such that Dr. Gallard has found digitalis most beneficial. He relates a case of a young man treated at the Hôpital de la Pitié with success by the use of digitalis. This drug, however, was not employed alone; but Dr. Gallard calls attention to the fact that the previous treatment by blistering and tartarized antimony produced no effect, and was discontinued because the patient was unable to bear it, owing to his weakness and depression. The digitalis was given in powders, each containing five centigrammes, to be taken every two hours. In twenty-four hours the pulse was reduced twenty beats, and in forty-eight hours forty-eight beats, having been originally one hundred and eight, and being reduced to sixty. The improvement in the local symptoms soon followed that of the general symptoms, and the patient, who was considered unable to resist an energetic antiphlogistic treatment, recovered in less than a week from a most alarming attack.—*British and Foreign Medico-Chirurgical Review*, Oct. 1866, from *Bulletin Général de Thérapeutique*, March 30, 1866.

15. *Treatment of Unabsorbed Pneumonic Deposits.*—Dr. ANDREW CLARK, in a paper read before the Medical Society of London (Oct. 15, 1866), began by defining the conditions of which he spoke, and showed that, though not uncommon, they were often overlooked. He then proceeded to discuss the signs and symptoms by which the presence of these deposits was to be recognized, and the difficulties incident to a correct diagnosis. The destiny of the deposits was next passed in review: he said they were absorbed; or they became contracted, hard, and tantamount to lumps of yellow tubercle; or they broke up into cavities, the case being then clinically undistinguishable from ordinary phthisis; or they issued in rare cases in the development of cancerous disease. Dr. Clark next told the history of thirteen cases which had been purposely left without treatment, in order to illustrate the natural history of the deposits, and show the relative proportions in which they became absorbed, indurated, or broken up into cavities. In these thirteen cases the deposits disappeared within five months in four; remained little altered at the end of two years in six; and went on to softening and fatal destruction of lung within little more than a year in three. The author then considered the conditions which hastened or hindered recovery, and pointed out their bearing upon treatment. He next discussed whether, above this natural treatment, art possessed other resources by which the number of recoveries might be increased and that of untoward issues diminished; and he said that he was able by his experiments to answer the question in the affirmative. His experiments were conducted exclusively on men, and all were placed as nearly as possible under the same hygienic rules. The objects of these rules were to raise the general health to its highest point, to promote the thorough moulting of the textures, and to foster the physiological conditions favourable to active absorption and excretion. The patients were ordered

to sponge every evening with tepid water; to take daily three substantial meals, in which meat, bread, milk, and eggs formed the leading constituents; to consume in the course of the day from three to four pints of fluid, of which one should be malt; to have plenty of out-door exercise, fresh air, and recreation; to exercise the lungs frequently by means of deep inspirations; to clothe warmly; to avoid hot crowded rooms, damp places, draughts of cold air, and worry of every kind. With these directions, common to all, the cases were treated on three different plans—the mercurial, the acid tonic, and the alkaline tonic. The mercurial plan consisted of counter-irritation and bringing the patient slowly under the influence of mercury by means of gray powder and ipecacuan; the acid tonic plan in giving quinia, or quinia and iron, with acids; the alkaline tonic plan, first, in the administration of bark, iodide of potassium, bicarbonate of potassium, and ammonia till the urine became alkaline, when this mixture was replaced by five-drop doses of the arseniate of soda; and second, in the inhalation twice a day of sprays of weak solutions of bicarbonate, chlorate, or nitrate of potash. When there was irritability of stomach bromide of potassium replaced the iodide; and when there was anæmia, calumba or quassia was substituted for bark, and five to ten grains of citrate of iron added to each dose. The author then contrasted the statistical results of the thirteen cases left to themselves with sixteen cases treated on the mercurial plan, seventeen on the tonic, and nineteen on the alkaline, and drew from them the following among other conclusions: "That art might be made of real service to nature in the recovery of these cases; that the mercurial plan was by far the worst, and the alkaline plan decidedly the best, method of treating them. The author explained the reserve with which we should adopt rules of treatment based upon mere statistical returns, and pointed out how important an element in the confirmation of their accuracy was the moral conviction of the practitioner begotten by multitudes of impressions, and growing up through multitudes of corrections and limitations. He concluded by saying that, as art had proved to be of real help to nature in the removal of pneumonic deposits, it was our duty, so long as the extent to which that help might go remained uncertain, to endeavour to determine it by therapeutical experiment.

In the discussion which ensued, Dr. Palfrey, Dr. Camps, Dr. Symes Thompson, Dr. Sanson, Dr. Broadbent, Mr. Hinton, Dr. Routh, Mr. Barnes, and Dr. Hare took part. It was generally considered that the statistics of cases adduced by Dr. Clark were conclusive in showing that pneumonic phthisis was not so formidable and fatal a disease as had been formerly supposed, and that the system of supporting the patient was that indicated.—*Lancet*, Oct. 20, 1866.

16. *Detection of Lung-tissue in the Expectoration of Persons affected with Phthisis.*—Dr. SAMUEL FENWICK read a paper on this subject before the Royal Medical and Chirurgical Society (June 26), in which he gives the results obtained from the examination by the microscope of the expectoration of 100 real or suspected cases of phthisis. The plan hitherto recommended of searching for pulmonary tissue in sputum has been to spread it on a flat surface, and to pick out of it with needles any portions that might appear likely to contain elastic fibre. He has, on the contrary, been in the habit of liquefying the expectoration by boiling it with a solution of pure soda, and then placing the fluid in a conical shaped glass, when every particle of elastic tissue falls to the bottom, and can be removed and placed under the microscope, as is done in the examination of urinary deposits. In this way he has easily found $\frac{1}{100}$ part of a grain of pulmonary structure after it had been mixed in bronchial mucus; and he calculates that $\frac{1}{40000}$ to $\frac{1}{80000}$ part of a grain may be detected in any expectoration that may contain it. In 13 out of 23 cases in which tubercle was suspected to be in the first stage, lung-tissue was found in the sputum. In 7 of the 23 cases, there was no physical sign of tubercle, but its existence in the lung was suspected from general symptoms only; and in the expectoration from these there was no pulmonary tissue. In 16 cases there were stethoscopic signs leading to the belief that tubercle was present; and in 13 of them elastic fibre was found in the mucus coughed up. There were 24 cases in which auscultation and percussion indicated softening of tubercle in the lungs, and in all pulmonary tissue

was present in the sputa. In 15 the physical signs were of a doubtful nature, and 7 of these presented microscopic evidence of ulceration of the lungs. In 35 cases the stethoscope indicated cavities, and in all these there were fragments of lung-tissue in the expectoration. In 2 cases the author had diagnosed enlarged bronchial tubes, and in neither of them was there any appearance of elastic fibre in the sputum. In 69 cases he counted the numbers and size of the fragments of lung expelled. In one specimen, coughed up in twelve hours, 800 fragments were found; and often 50 or 60 fragments were detected, where, from the stethoscopic signs alone, no great destruction of lung could have been anticipated. The proportion of bronchial tubes the author found to be least in the stage of softening, and greatest where the stethoscope indicated cavities. The greatest proportion of fragments of single air-cells was found in the first stage, and the largest proportion of large fragments of lung where cavities existed. The author concluded his paper by giving a number of practical directions as to the best method of conducting the examination of the expectoration, in order to find with quickness and certainty and pulmonary tissue that may be present.—*Med. Times and Gaz.*, Sept. 29th, 1866.

17. *Consumption treated with Pancreatic Emulsion of Solid Fat.*—Dr. HORACE DOBELL reports (*Lancet*, Nov. 17, 1866) the results of 187 carefully watched cases, and the sum of the whole series, which has extended over about three years, is as follows:—

In the first stage (advanced), 45 cases; second stage, 69; third stage, 73. Condition on discharge measured by general symptoms: Improved, 158; stationary, 8; worse, 18; not noted, 3. Measured by physical signs: improved, 118; stationary, 46; worse, 18; not noted, 5.

Emulsion agreed, 180; disagreed, 7.

Cod-liver oil agreed, 75; disagreed, 98; not tried, 14.

18. *Hydatid of the Liver, treated successfully by the Injection of the Extract of Male Fern into the Cyst.*—Dr. F. W. PAVY communicated the following case of this to the Royal Med. and Chirurgical Society, (June 26). Harriet V., a woman of pretty healthy appearance, aged twenty-one, admitted into Mary Ward under the care of Dr. Pavy, October 4, 1865. When three years old she was squeezd against a wall by a cart wheel, which struck her somewhere on the right side of the chest. No rib was fractured, and she soon recovered from the accident. About six years ago the patient noticed a slight swelling in her right side, which has since continued gradually increasing in size. On examination, a large deep-seated tumour was to be noticed occupying the right hypochondriac region, and extending considerably beyond, both above and below. Its boundary could be clearly defined inferiorly. It caused a considerable bulging of the ribs on the right side, and the right mammary gland was raised about three-quarters of an inch above the level of the left. Fluctuation was apparent. Dulness extended as high as the lower border of the second rib on the right side. The case was diagnosed to be one of hydatid tumour of the liver. The relationship that is agreed upon by helminthologists to exists between the hydatid and the tænia, and the known effect of the extract of male fern upon the latter, suggested to the author the treatment adopted. The extract is not miscible with alcohol or water, but it was ascertained that a liquid sufficiently thin for passing through a fine canula was to be obtained by admixture with a little potash. November 6th.—A fine trocar and canula were introduced into the tumour by Mr. Durham, and about four ounces of a limpid colourless fluid allowed to escape, in order to diminish the tension of the cyst. A liquid consisting of half a drachm (by measure) of the purified semi-fluid extract of male fern, half a drachm of liquor potassæ, and six drachms of water, was then injected into the sac, care being taken throughout to prevent the entrance of air. The fluid removed was examined, and found to be non-albuminous, charged with a large quantity of the chloride of sodium, and to contain hooklets of the echinococcus. At the introduction of the trocar the patient complained of experiencing a considerable amount of pain, which she referred to the lower part of the abdomen. Some febrile excitement, vomiting, and purging followed, but there

was no evidence of peritonitis. 10th.—On percussion, it was found that dulness did not extend so high in the chest on the right side by one rib as previous to the operation. 16th.—The patient was allowed to get up. 20th.—The tumour was found to be much diminished in size. It was much softer, did not extend so low down in the abdomen, and was much less distinctly circumscribed. The chest was resonant on percussion as low as the space between the fourth and fifth ribs. 29th.—The circumference over the most projecting part of the tumour before the operation was $34\frac{1}{4}$ inches; to-day it is $31\frac{3}{4}$ inches, showing a reduction of $2\frac{1}{2}$ inches. Tumour very soft, and its lower border not to be defined as formerly. The patient, being well, was allowed to leave the hospital. A fortnight and again a month afterwards she was seen, and found to be progressing satisfactorily. May 10, 1866.—Since she was last seen the patient had suffered from an attack of rheumatic fever with heart complication and bronchitis. She had been in no way troubled with her side, and her circumference now was 30 inches. No swelling was perceptible to the eye, but a hardness remained in the hypochondriac region. The inference to be drawn from the result in this case is, that the injection of the extract of male fern caused an immediate destruction of the life of the hydatid without the production of suppuration, and that a rapid absorption of the fluid element of the cyst afterwards took place. —*Med. Times and Gaz.*, Sept. 29th, 1866.

19. *Elimination in Cholera*.—Prof. LIONEL BEALE discusses ably in two articles in the *Med. Times and Gazette* (Sept. 29 and Oct. 6, 1866,) the doctrine of elimination in cholera and briefly states the principal conclusions at which he has arrived as follows:—

1. That the gland-cell is not, as a general rule, destroyed when it secretes.
2. That the poisons "eliminated" by the skin and kidneys are probably in a state of solution.
3. That the poisons of contagious diseases are not soluble, but consist of living germs which move of themselves, but which cannot be "eliminated" from the blood by epithelial or other cells.
4. That so far from there being any evidence of the epithelial cells eliminating contagious poisons, the living particles of the latter interfere with the action of the cells, and many cells are destroyed by them.
5. That the function of the columnar epithelial cells is to draw substances from the intestine and pass them on towards the blood, and that therefore it is most improbable that these cells should take part in "eliminating" anything whatever from the blood.

[If these conclusions be just—and we believe them to be so—they are fatal to Professor Johnson's theory of cholera.]

20. *Treatment of Rheumatism*.—In a discussion at the recent meeting of the British Medical Association, brought on by a paper on this subject, Professor BENNETT said that he understood the paper now read to advocate the good effects of quinia; and he should like to hear that brought out. It was some years since he had made any very careful trial of the alkaline treatment. It had occurred to him to ask, How long does rheumatism take to get well of itself? Until that point was settled, how could they determine what to do? He regretted that they had not had out that discussion on Dr. Stewart's paper on the previous day. Who could venture to say this or that treatment was or was not successful, if he did not know how long the disease was likely to last of itself. He had tried everything—there was no drug he had not tried—in rheumatism; and he found them all pretty much alike. He had tried nothing, and the result had been the same. He had tried the blanket, with the same result. They had given the alkaline treatment a most careful trial in Edinburgh, and it had seemed to him to shorten the duration of the disease a little. In Edinburgh, they saw a great deal of rheumatism in servant-girls, on account of the system of washing adopted there. Girls got up very early in the morning to wash, and in all weathers, without care as to clothing, they alternated carelessly between the hot steaming kitchen in which the washing was done and the open air, often bitterly cold, where they hung the clothes to dry. He thought

he had observed that, where a strong young girl of this sort was seized with rheumatism, the acute symptoms had a tendency to disappear in about six or seven days; and if there were much complication, it would disappear in about fourteen or fifteen days. If the girl were weak, they found that murmur at the heart for which formerly violent remedies—mercury and so on—were given. Then, as, under the influence of rest and good diet and warm, comfortable treatment, the patient became stronger, the murmur went away. In the old time, when mercury was given in these cases, it generally so happened that the murmur went away about the same time as the mercury touched the gums; and so it was concluded that the murmur went away in consequence of the mercury touching the gums. Now mercury was not given, and yet the murmur went away as soon. They had come to the conclusion in Edinburgh that, in one of the healthy cases he had named, if alkalies were used—they gave nitrate of potash—instead of being seven days, the average duration of the acute symptoms was six days and a half. He had given nitrate of potash regularly ever since coming to that conclusion. His view was that acute rheumatism cured itself. It had once been said that six weeks in bed was the best cure for everything; and he had noticed that, of Dr. Stewart's cases mentioned on the previous day, the average duration was forty-two days, which was just six weeks.—*British Med. Journ.*, Aug. 25, 1866.

21. *Chronic Albuminuria, originating during Convalescence from Scarlet Fever and other Eruptive Diseases.*—Dr. HERMANN WEBER read a paper on this subject before the Royal Medical and Chirurgical Society, in which he stated that his remarks do not refer to the well-known and easily recognized acute scarlatinal dropsy or desquamative nephritis of scarlet fever, but to a chronic form of albuminuria originating occasionally at a much later period, when recovery had apparently been established already for several weeks. The author related three cases of scarlet fever, unattended with albumen in the urine or any other symptoms of renal complication during the first four weeks from the commencement. The subjects of the cases appeared quite well at the end of about a month, when they returned to their usual mode of living; but about three or four weeks later the general health became disturbed (loss of appetite and strength, headache, glandular swellings, boils, anæmia, and occasional sickness), and the urine, as soon as the patients came under treatment was found highly albuminous. Perfect recovery took place in one case; while in another the general health became much improved, but a slight degree of albuminuria has remained; and in the third case death occurred seven years after the commencement from broncho-pneumonia, with uræmic symptoms, the post-mortem examination exhibiting waxy degeneration (amyloid) of the kidneys. The author maintains that the connection between the scarlet fever and the renal disease in this class of cases is not the same as in the acute scarlatinal dropsy; while the latter may be considered as a part of the scarlet fever process, the former, originating at a much later period, is probably only so far connected with the scarlet fever that through it a greater susceptibility to the development of chronic renal disease is effected, in the same way as there results a tendency to other chronic affections, like glandular swellings and eruption of boils. The author believes that the same tendency may be caused also by other acute diseases, especially those of an exanthematous nature, and gave two cases in which chronic albuminuria took its origin in persons who had lately recovered from erysipelas of the head and typhoid fever respectively, in both of which cases, during the febrile state and during the convalescence, the urine had been quite free from albumen. He referred also to a similar case occurring after typhus fever, and described by Dr. Johnson in his work on Diseases of the Kidneys (London, 1852, p. 408). The author was inclined to infer from such cases that amongst the many cases of Bright's disease the origin of which is uncertain, a not inconsiderable proportion may have been developed during the later stages of convalescence from exanthematous diseases; that, therefore, as urged already by Dr. Johnson with regard to fever, particular care ought to be taken during these stages with regard to diet, clothing, habitation, avoidance of over-exertion, and

exposure to cold and damp air. Dr. Weber further pointed out the insidiousness of the commencement of this chronic albuminuria, as, in four cases out of the five related, anasarca and admixture of blood with the urine were altogether absent. Lassitude, loss of strength, anorexia, swelling of the lymphatic glands, and eruptions of boils, being the principal symptoms, ought, therefore, always to lead to an examination of the urine, the more so as by an early discovery of the renal disease the chance of a perfect cure is much increased, as seen in two of the five cases reported.

The treatment consisted in attention to skin and diet: in the administration of iron which acidulated acetate of ammonia, and occasional doses of elaterium to relieve the kidneys, and in the use of the hot vapor bath or the warm wet sheet.—*Med. Times and Gaz.*, Sept. 29th, 1866.

22. *Training, or Forced Exercise in the Treatment of Diabetes.*—Professor BOUCHARDAT, while admitting the efficacy of alimentary treatment in diabetes, considers it only as palliative, and he recommends the adoption of energetic exercise. This idea is not a novelty on his part, as in former writings he recommended, in the case of patients affected with this complaint, the energetic action of their bodies and arms; and then he ascertained that labour in the open air always promotes the utilization of the feculent matters in diabetic patients. It is not sufficient in all cases to cause the disappearance of the sugar, but, all things being equal, in regard to the quantity of feculent matters absorbed and other conditions, a diminution in the proportion of sugar contained in the urine always coincided with exercise in the open air. M. Bouchardat gives an instance of remarkable success in the treatment of diabetes attained by this treatment, the diet being carefully regulated and the urine being examined at intervals. Although the patient may at first be very weak, the adoption of exercise will gradually give him strength. It is of the greatest importance, according to M. Bouchardat, to use the strength in proportion as it returns; and daily exercise of the body, arms, and legs is indispensable. The greatest care must be taken to find some daily exercise which is agreeable to the patient—as, for instance, in the case of men, hunting, rowing, fencing, skating, billiards, cricket, &c.—or any ordinary manual employment, as sawing, cleaving wood, turning, and the active work of gardening; and in women, all the active household employments, especially those which require the action of the legs rather than standing without walking. Riding in a carriage is not to be adopted except when no other exercise is possible; but riding on horseback is a salutary kind of movement, although it cannot be substituted for all the others. Of all the modes of exercise, that which is most convenient must be chosen; and it ought to be energetic, so as to produce a thorough sweating over the whole body; and then all necessary precaution should be taken to prevent the chance of chilling the system. M. Bouchardat relates several cases in which his system was successfully adopted in the treatment of diabetes; he considers the exercise of the gymnasium especially useful when such an establishment is well conducted, and he gives some rules to be followed by the patients. When the exercise has been continued for about an hour, and all the body is bathed in sweat, the flannel should be changed, and the skin washed briskly with cloths soaked in cold water, then strongly rubbed with coarse gloves or towels, or flesh-brushes. Then the body is to be struck and kneaded, so as to produce a complete reaction, which is sustained by a walk of a quarter of an hour at least, the body being protected by good woollen clothes. The skin should not be neglected while these exercises are used, and salt-water baths, either warm, or, what is better, cold, if they can be borne, are, according to M. Bouchardat, of almost invariable utility. During the treatment the diet must be carefully regulated, glycogenic substances being avoided while the urine is diabetic, and resumed only when the sugar has disappeared. The red wines of Bordeaux or Burgundy may be drunk; but sparkling wines, like champagne, should be avoided. Coffee and tea, without sugar, are sometimes suitable, but their employment must be regulated by the condition of the urine after they are taken.—*British and Foreign Medico-Chirurgical Review*, Oct. 1866, from *Bulletin Général de Thérapeutique*, Dec. 30, 1866.

23. *Change of Type in Disease.*—Dr. SYMONDS has ably discussed this subject in a letter addressed to Dr. Markham, published in the *Med. Times and Gazette*, Oct. 6, 1866. We give a few extracts from that letter:—

“Why has this powerful remedy [venesection] fallen into comparative disuse? My answer would be prompt and unhesitating: it is because, under my own observation and the observation of many of my medical brethren in various parts of the country, inflammations have become less frequent and less violent, and when they have occurred they have been accompanied by a condition of the whole body that has not borne much depletion or lowering by any measures, and has often required a speedy use of stimulants. Nearly thirty years ago the attention of the profession was directed by Dr. Stokes,¹ in words which I have never since forgotten, to that stage in inflammatory cases when stimulants must take the place of antiphlogistic remedies. Now, that stage in my early experience used to come only after a long persistence of the opposite condition. But when the ‘change of type’ in inflammatory cases became manifest, it was, among other signs, betokened by this particular fact, that the state of depression came on much earlier than formerly—nay, that some cases began where others used to end.

* * *

“One word, before closing this long letter, on the *à priori* argument for or against what is called change of type in disease. It seems to me that all analogy is in favour of the probability that in different eras human beings should be differently affected by such an agency as abstraction of blood. When the practice of it was most common, limitations were always kept in view as to the subjects to whom it was applicable, and the degree to which they could or could not bear it. Every practitioner knew that there were persons in regard to whom it was necessary to exercise great caution, and others who by circumstances of age, or habits, or previous disease, or by idiosyncrasy, or by what was termed “the epidemic condition,” were altogether unfit for the remedy. If this held good as to individuals or limited classes, I do not see why it might not prove true of great numbers—nay, of the majority of the community—as in late years and at the present time. If over at least two decades of years there has been a remarkable prevalence of epidemic catarrh followed by a great variety of neuralgic disorders—if there are times when boils and carbuncles become rife to a degree unknown for one or two generations—if diseases so characterized by asthenia as diphtheritis come and establish themselves as new calamities—I do not see why inflammations may not in certain periods of time assume peculiar aspects, especially in regard to the subject which we are reviewing. I cannot consent to discuss inflammations in relation to our present inquiry as if they were definite organisms, like objects of natural history. Even allowing that pneumonia, or meningitis, or peritonitis, is the same in Peter as in Paul (though this is quite open to question), yet when we have to consider the cure of these diseases, especially in their acute forms, we of course really have to consider the cure of the men, women, and children afflicted with these diseases, and in whom the local inflammations may, over various periods, be attended with conditions of the whole body as peculiar to the time as those which are presented in furuncular, and catarrhal, and choleraic or other epidemics. As to some of these, it may be alleged, with less or more of probability, that, apart from alterations in human diatheses, there have been importations or developments of new seeds of diseases, surmised germs, or cells, or ferments; but even these hypothetical agents would hardly cover all the cases in which certain disorders become rife at particular times. What successions or conjunctions of agencies from air and vapour and the imponderable forces of nature, or what malarious emanations of the earth, or what changes in food, and habits, and clothing, and occupation, may bring about certain changes in human constitutions in particular times, so that inflammatory diseases shall be more asthenic and less fit for treatment by abstraction of blood, we cannot pretend to conjecture. But there is no *à priori* improbability that such causes have been in operation. Just about twenty years ago a terrible epidemic—terrible because

¹ In the chapter on the Treatment of Bronchitis in his masterly treatise on Diseases of the Chest, p. 114.

of the famine it brought upon a whole people—attacked the potato plant. There were suppositions of insects, or fungi, or of some morbidic materies imported; but, however much or little truth there may have been in those conjectures, it is but too obvious that the plant shows at the present epoch an asthenic constitution to such a degree that if the summer and autumn prove more rainy than usual, the plant is less able to bear the evil influence of the weather than in old times, and that it sickens in its leaf and decays in its tuber. Would that we could suppose the human body to be impregnable to analogous influences? * * *

"One word more, and I have done. It has been my lot to observe diseases in different parts of England, and to compare my observations with those of other physicians, and one of the results of my experience (it was long before 'change of type' came to be discussed) was that inflammatory cases were more sthenic in some districts than in others. If this experience may be trusted, and if, under the outward agencies operating in certain districts, diseases can be more or less characterized by strength or debility, is there not a probability that, in the ever-shifting combinations and sequences of meteorologic and other influences in successive periods of time, the whole population of a country may present varying phases of disease in general, and of inflammation in particular?"

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

24. *Development of Epithelial Cancer in Internal Organs.*—Dr. C. OTTO WEBER says that secondary canceroid deposits are found in internal organs much more frequently than is believed. His researches have been made chiefly in the liver and lungs. The epitheliomata in internal organs, he says, are developed at the expense of the nuclei of the interstitial connective tissue and not of the proper epithelial cells of the organs. He gives several instances of the coexistence of epithelial cancer and tubercle in the same organs. From experiments on animals, Dr. Weber is led to conclude that these secondary cancers are developed like metastatic abscesses. They do not arise from cells detached from the original cancer and carried along in the circulation; but the embolus exerts some inexplicable catalytic influence, and its presence determines the excessive growth of nuclei of connective tissue, with the result of forming a secondary cancer.—*Gaz. Méd. de Paris*, June 16, from *Virchow's Archiv*.

25. *Results attending the Removal of the First Growth of Cancer*—Mr. JOHN BIRKETT, Surgeon to Guy's Hospital, in an interesting communication read before the British Medical Association at its meeting in August last, presented the results attending the excision of the entire mammary gland, or a part of it, when involved with a cancerous growth. "He is obliged," he says, "to do this without taking into consideration many collateral circumstances of very great importance; such as the condition of the integuments, of the axillary lymphatic glands, the duration of the growth, the progress made by the disease in each individual case, the variety of the disease, and other points. The above, singly or collectively exert much influence on the result; but it would occupy too much time to enter upon these important details at this meeting."

With a view to answer the question, What advantage does a patient obtain by submitting to the removal of a cancerous tumour? Mr. B. gives the results of his investigation of one hundred and fifty cases carefully recorded by himself. A majority of these patients are dead, for the investigation was commenced eighteen years since. No selection of cases was made. "These statistical tables and deductions therefrom by means of averages afford," Mr. B. admits, "fallacious guides to treatment."

"Table A is arranged to show the length of time during which 150 patients

were free from any indications of the local recurrence of the disease after the removal of the first growth.

"A.—Table showing the length of time during which 150 patients were free from indications of the local recurrence of the disease after operation.

	Cases.
Before the expiration of the first year	87
Between expiration of first year and close of second	15
“ second and third	7
“ third and fourth	7
“ fifth and sixth	5
“ sixth and seventh	2
“ seventh and eighth	1
“ eighth and ninth	3
“ ninth and tenth	1
“ tenth and eleventh	3
“ fourteenth and fifteenth	1
“ fifteenth and sixteenth	1
Sixteen years	2
Patients died free from local disease in part first affected (see table)	15

150

“Before the expiration of the first year, eighty-seven patients showed signs of a new development of the growth, either in the portion of the mammary gland not removed, the integuments in the neighbourhood of the cicatrix, in that structure itself, or in the axillary lymphatic glands.

“After the expiration of the first year, and before the conclusion of the second, fifteen patients showed that a cancerous growth was again developed in one or other of the regions above mentioned.

“Now, this large proportion of the cases in which recurrence occurred might be taken as a significant fact to demonstrate that the cases submitted to operation were badly selected; that, indeed, an operation was scarcely justifiable. But, in many of the cases, the operation was undertaken in the hope of removing the source of great local pain and mental distress; of alleviating the misery and to abate the annoyance attending an ulcerated and sloughing surface, and at the earnest solicitation of the sufferer.

“In some, I confess, little, if any, advantages were gained. In others, although life was not prolonged by many months, the existence of the individual was rendered more tolerable, since the attendant circumstances before described were sometimes absent. Life was decidedly prolonged in a few cases, in which it was rapidly ebbing in consequence of repeated hemorrhages and deeply sloughing masses.

“Further, we may be allowed to suggest that many of the cases in this category might have been operated upon at a much earlier period after the discovery of the first growth, and with every probability of a happier result. But in hospital cases, and a large majority were of that class, it too often happens that patients apply to such institutions as a last resource only.

“We may now turn to a somewhat brighter picture. To be free from such a disease as cancer for periods of time extending between three and sixteen years is a fact surely sufficient to justify almost any means to accomplish such a desirable end. The risk of life attending the operation is not great, and now much of the horror of such a proceeding is mitigated by the employment of anæsthetics.

“In the wards of a hospital, even where the chances against the recovery of the patient are greater than in private practice, I calculate the death-rate at only seven per cent. During the last seventeen years, two hundred patients have been operated upon by my colleagues and myself in Guy's Hospital. Either the whole or a portion of the breast-gland was removed on account of a carcinomatous growth. All of these recovered from the effects of the operation, with the

exception of fourteen, who survived it between three and thirty-six days only. It must be admitted that the operation was more or less the exciting cause of the disease which terminated life. These fatal diseases were erysipelas, followed by bronchitis; inflammation of the pleura, terminating in effusion; pyæmia; hæmoptysis; and vomiting. In fact, the too common causes of fatal complications after operations upon the poorer classes, inhabitants of large cities.

"But in private cases the mortality is so trifling that, admitting the risk to which every person submits who undergoes any operation, I am inclined to calculate it at not more than three or four per cent. I have lost only one patient, of forty-one cases operated upon for cancer.

"To proceed with the remaining cases. Of the patients, thirty-three in number, who survived the operation without any local recurrence of the cancer for periods varying between two and sixteen years, assuredly many of them must have died of the complaint within those periods; and all of them would certainly have been compelled to endure the mental anguish, if not the local suffering, accompanying the existence of this terrible malady, assuming that they had survived equal periods.

"Lastly, fifteen of the patients died without showing external signs of recurrence of cancer in the region first affected.

"B.—Cases in which the cancer did not reappear in the part first affected with that growth.

Case.	Survival after operation.	Cause of death.	Condition of local disease at operation.
1	6 months	Hepatic disease	Integuments infiltrated
2	10 months	Thoracic disease	In same condition
3	11 months	Hepatic disease	As above
4	13 months	Carcinoma in calvaria	Mammary gland only infiltrated
5	15 months	Disease of ovary	As above
6	2 years	Cerebral disease	Integuments infiltrated
7	2 yrs. and 2 mos.	Hepatic disease	Integuments infiltrated & ulcerated
8	3 years	Thoracic disease	Mammary gland infiltrated only
9	4 yrs. and 3 mos.	Cerebral disease	Same as above
10	6 years	Thoracic disease	Integuments infiltrated
11	6 years	Cerebral disease	Integuments infiltrated & ulcerated
12	6 yrs. and 6 mos.	Exhaustion	Mammary gland infiltrated
13	6 yrs. and 8 mos.	Thoracic disease	Integuments infiltrated
14	10 yrs. and 6 mos.	Cachexia	Integuments ulcerated
15	11 years	Cachexia	Mammary gland infiltrated

"The Table B shows the length of time each individual survived the operation. This was between six months, the shortest time, and eleven years, the longest. In another column is stated the cause of death in each case, which was the development of cancerous growths in the viscera of either the cranium, the thorax, or abdomen, as determined by well-marked indications during life or by post-mortem examinations.

"I have introduced, on the same table, as brief a description as possible of the condition of the local disease at the time of the operation; and it should be noted that it had made considerable progress in some of them. The integuments were infiltrated with cancer; in some ulceration of the surface existed. Under these conditions we are justified in assuming that some of the patients would speedily have fallen victims to the ravages of the complaint, and that all must have endured more or less of the suffering accompanying its progressive stages.

"By the removal of the growth, these fifteen patients were exempt from the misery inseparable from the activity of the local disease.

"Let us next inquire if the life of individuals afflicted with cancer of the breast is prolonged by the removal of the part first involved by the disease.

"c.—Table to show the number of years 150 patients survived the discovery of the disease after the removal of the first growth.

Under 1 year	. . . . . 8	Above 10 years	. . . . . 2
Above 1 "	. . . . . 24	" 11 "	. . . . . 2
" 2 years	. . . . . 38	" 12 "	. . . . . 1
" 3 "	. . . . . 17	" 13 "	. . . . . 1
" 4 "	. . . . . 21	" 14 "	. . . . . 2
" 5 "	. . . . . 7	" 15 "	. . . . . 1
" 6 "	. . . . . 5	About 23 "	. . . . . 1
" 7 "	. . . . . 10	" 29 "	. . . . . 1
" 8 "	. . . . . 4	" 32 "	. . . . . 1
" 9 "	. . . . . 4		

"I have arranged Table c to show the number of years 150 patients survived the discovery of the disease after the removal of the first growth. Rather more than one-half died before the expiration of the fourth year, or in the ratio of fifty-eight per cent.; the majority dying before the completion of the third year.

"Thirty-three died before the expiration of the seventh year, or in the ratio of twenty-two per cent.

"Eighteen died before the conclusion of the tenth year, or in the ratio of twelve per cent.

"Twelve survived above ten years, or in the ratio of eight per cent. One person lived about thirty years after the discovery of the disease.

"In order to form some comparison between cases subjected to the above treatment, and those in which the disease was allowed to pursue its natural course, with the exception of using local palliatives and constitutional measures, I calculated the average duration of life of a hundred patients.

"Fourteen of these patients died within the first year after the observation of the disease; three survived its discovery above ten years, two of them having lingered under its slow progress about twenty-six years.

"The average duration of life I believe to be about three and a half years.

"Of the cases, then, which have fallen under my own observation, it is quite certain that the longest survivors have been those from whom the first growth was removed.

"Whether the duration of life was really essentially due to the removal of the first growth, I would not venture to assert dogmatically; for there are many collateral circumstances which require to be taken into consideration for which the time is insufficient upon the present occasion.

"In conclusion, I trust that I have demonstrated to my sceptical professional brethren that a certain proportion of cancer patients can receive benefit by submitting to the removal of the first growth of the disease; and that the benefit derived from the operation is twofold, viz., 1, prolongation of life; 2, exemption from the disease for a considerable period of time in many instances."—*Brit. Med. Journal*, Sept. 29, 1866.

26. *Elephantiasis of the Scrotum*.—Prof. JAMES SYME reports (*Edinburgh Med. Journ.*, Nov. 1866) the following interesting case of this in which he successfully extirpated the tumour.

G. W., æt. 26, applied to him in the early part of August last on account of an hypertrophied scrotum, which presented the characteristic features of elephantiasis. "The tumour was so large as not only to produce great inconvenience, but to render any active employment impracticable. The left leg, from the knee downwards, presented an enlargement of the same kind, to nearly twice its natural size. The young man stated that he had gone to Australia three years ago, and that three months after being there he had observed the swelling of his scrotum, which, since then, gradually increased, and, more recently, had been followed by that of the leg.

"On the 28th of August, having placed the patient on his back, and administered chloroform, I introduced a blunt-pointed curved bistoury into the opening, from which the urine issued, and cut through the body of the tumour directly upwards, so as to expose the glands, then extended this incision to the pubes,

and down to the body of the penis, which was detached from its connections, and held up by an assistant. I next cut laterally through the tumour, so as to expose the left tunica vaginalis, which, having been separated from its surrounding attachments, was held in the hand while an incision was carried along the cord to the pubes, and then transversely to the groin: the same procedure was repeated on the right side, so as to give the wound a T form; and, lastly, while the organs that had been saved were held out of harm's way, I detached the mass by a free use of the knife.

"The operation, as just described, was performed without any delay or difficulty, and in one slight respect appears an improvement of the plan pursued by Dr. Fayrer, who makes three longitudinal incisions—one of which is in the direction of the penis, and the others along the spermatic cords. Instead of this, searching latterly for the testicles through the soft substance of the tumour after digging out the penis, and using them as guides in cutting up towards the pubes, may, I think, perhaps be found more convenient. Little blood was lost, as the gentleman who assisted me quickly compressed the vessels. Some folds of lint supported by a bandage, were placed over the penis and testicles to keep them in their proper position, which, in the course of a few days, they were found to retain with the most natural aspect, and contraction proceeded so rapidly that the patient was able to return home before the end of three weeks. At the end of a similar period he came to show the wound almost completely cicatrized.

"It is worthy of notice that the leg, which presented such distinct features of elephantiasis as made me hesitate to undertake removal of the scrotal tumour, diminished quickly after the operation, so that when the patient left the hospital there was hardly any trace of the enlargement. Had the femoral artery been tied, this spontaneous improvement would doubtless have been attributed to a procedure that, so far as I can see, has no foundation on any sound surgical principle."

27. *Galvanic Cautey in Varicocele*.—P. B., æt. 44, had suffered during eight years from a large varicocele on the left side. On January 29th, M. AMESAT applied the galvanic cautey to the varicose veins of the spermatic cord. The mass of veins, having been first isolated carefully from the vas deferens, was surrounded by a loop of platinum wire, the two ends of which were brought out through the same opening in the skin, and placed in connection with a Middel-dorpf's apparatus. As soon as the circuit was established, the wire became incandescent; and in a few minutes the vessels were cauterized and divided. The operation was very painful, but was well borne. The only dressing applied was a little cotton wool in a suspensory bandage. In the evening, the patient was a little feverish; but afterwards he had no pain nor any bad symptoms. He kept in bed eighteen days, and, at the end of May, the cure remained complete. *Brit. Med. Journ.*, Oct. 27, 1866, from *Bull. Gén. de Thérap.*, June 30, 1866.

28. *Results of the Operation of Complete Evulsion of the Astragalus, performed by British Surgeons*.—Mr. H. Huxcock, Prof. of Surgery in the Royal College of Surgeons, in a recent course of lectures gives the following statistics:—

"I have collected 57 cases. Of these, 33 were for compound dislocation; of which 5 were complicated with fracture, 12 were for simple dislocation, and 3 were for caries.

"Of the 33 performed for compound dislocation, 24 recovered with good, useful limbs; 1 underwent secondary amputation of the leg, and recovered; 8 died, of whom 1 had undergone secondary amputation.

"Of the 12 performed for simple dislocation, 9 recovered with good and useful limbs; of these 12, in 4, of whom 1 died, the bone was allowed to remain for a month; in 1 it was allowed to remain nineteen weeks; in 4, of whom 2 died, the bone was removed immediately.

"Of the 3 performed for disease, 2 recovered with good and useful limbs; 1 recovered for a time, but the disease returned in two years, necessitating amputation of the leg, the patient, however, doing well.

"In 3 the cause is not given. Of these, 1 died, and 2 terminated well.

"If to these we add 52 cases performed by surgeons abroad, we get 109 in the whole.

"Of these, 64 were for compound dislocations, of which, 5 were complicated with fracture; 4 were for compound fracture; 20 for simple dislocation; 10 for disease (caries); 1 was for necrosis; of 10 the causes are not stated.

"Of the 64 excisions performed for compound dislocation, 50 recovered with good and useful limbs; 1 underwent secondary amputation of the leg, and recovered; 11 died, of whom 1 had undergone secondary amputation; of 2 the results are not given.

"Of the 4 operated upon for compound fracture, 3 recovered with good and useful limbs; 1 died.

"Of the 20 operated upon for simple dislocation, in 4, of whom 1 died, the bone was allowed to remain for a month; in 1 the bone remained for nineteen weeks; in 7, of whom 2 died, the bone was removed immediately; in 2 the bone was removed for secondary caries, but at what period it is not stated. In the remaining 6 the period of removal is not given.

"Of these 20, 14 recovered with good and useful limbs; 3 died; in 3 the results are doubtful.

"Of the 10 cases performed for disease (caries), 6 recovered with good and useful limbs; 1 submitted to secondary amputation two years afterwards, and recovered; 1 died; in 2 the results are doubtful.

"The patient operated on for necrosis did well.

"Of the 10 cases the causes of which are unknown, 2 recovered with good and useful limbs; 1 died; in 7 the results are not known.

"So that of the 109 cases, 76 recovered with good and useful limbs; 2 submitted to secondary amputation, 1 recovered; 16 died, including 1 in which secondary amputation had been performed; in 14 the results are not known."—*Lancet*, Sept. 29, 1866.

29. *Ovariectomy twice successfully performed in the same Patient*.—Mr. T. SPENCER WELLS reported a case of this to the Royal Medical and Chirurgical Society, November 13, 1866. He alluded to three cases in which ovariectomy had been performed twice on the same patient. The first was by Dr. Atlee, of Philadelphia, sixteen years after the previous operation by Dr. Clay, of Manchester. The second was by the author, nine months after an operation by another surgeon. The third was by Dr. F. Bird, fourteen years after one of his own operations. The first case was successful. The second and third were not. The case now related is believed to be the first in which ovariectomy has been performed successfully twice on one patient by the same surgeon. In this case the author removed the left ovary of an unmarried woman, twenty-four years of age, in February, 1865. The tumour weighed twenty-nine pounds. The right ovary was then healthy. The patient recovered, and remained well more than a year. But, in about fifteen months, disease began in the right ovary, and advanced so rapidly that ovariectomy was performed for the second time eighteen months and a half after the first operation, and a tumour, weighing eighteen pounds, was removed with complete success. A full account of both operations was given, with a description of the tumours removed; and some remarks were added upon the comparative frequency of disease in one or both ovaries, and upon the appearance of disease in one ovary after the other had been removed. The author showed that the right and left ovaries are found diseased with equal frequency; and that in from one-third to a half of the cases where the disease has gone on to its termination in death, *both* ovaries are diseased. But he asserted that both ovaries are affected in much smaller proportion in the earlier stages of the disease. In the first one hundred and fifty cases in which he performed ovariectomy he only removed both ovaries in seven, and in only three others was disease in an early stage suspected in the ovary not removed. In three the ovary not removed, but examined and found healthy, had become diseased afterwards. In two of these cases the disease was malignant. The rule appears to be established that after a successful ovariectomy the patient is restored to good health; and, although there are occasional exceptions to this

rule, it is satisfactory to know that if the remaining ovary should become diseased, the first operation need not add much to the difficulty of the second; and that of four cases in which a second ovariectomy has been performed, two have proved successful.—*Med. Times and Gaz.*, Nov. 24, 1866.

30. *Reduction of the Subcoracoid Dislocation of Humerus.*—Dr. ALEXANDER GORDON states (*Brit. and For. Med.-Chir. Rev.*, Oct. 1866) that he has successfully employed, in nine consecutive cases, the following mode of reducing this dislocation:—

“If the right shoulder be dislocated, I place the patient on his back, with the shoulders raised, in bed, or on a mattress laid on the floor, or on a sofa. Standing on the same side and raising the elbow, I grasp the lower end of the right humerus; the thumb on the inner, with the fore and other fingers on the outer side, the forearm lying flexed at an acute angle, resting on the web between the thumb and fingers. I raise the arm upwards and forwards, so as to place it at right angles with the surface upon which the patient is lying. Besides, to have complete muscular quiescence, I tell the patient to permit the extremity to rest upon and be supported entirely by my left hand. With the right hand I feel for the head of the dislocated humerus, and press it downwards and outwards, either through the anterior wall of the axilla or in the axilla, moving at the same time, with the left hand, the lower end of the humerus upwards and backwards, with rotation chiefly inwards.

“Whilst thus engaged, I have felt on several occasions a snap or jerk, so marked as to lead me to suppose, for the moment, that the dislocation was reduced. This snap or jerk is due to the head of the humerus having changed its position; for when we depress it we free it from the coracoid process, and the supra- and infra-spinati muscles, being on the stretch, jerk it outwards to the anterior border of the glenoid fossa. When in this position, with the fingers in the axilla, I can feel almost the whole of the upper articular surface of the humerus, which I press outwards and forwards; or, in other words, I lift the head of the humerus over the inner margin of the glenoid cavity, assisting with the left by rotation and very slight extension, if necessary, when the head enters the glenoid fossa with a distinct snap.”

Dr. Gordon is convinced that this mode of reduction is equally applicable to other forms of dislocation of the humerus.

31. *Paraffin for the Construction of a Stiff Bandage in Fractures.*—Mr. LAWSON TAIT some time since proposed the use of paraffin in the construction of a stiff bandage for the treatment of fractures. Further experience has confirmed his judgment as to the utility of that substance.

“For the application of this substance as a stiff bandage,” he says, “it must be used in its pure state. It may be used as other substances are for this purpose, either with the bandage alone or to fix the bandage over wooden or pasteboard splints. In simple fractures I prefer to use it with the bandage alone, without any other splint. For this purpose I first enroll the limb with a soft cotton bandage, and over this I apply a series of strips of coarse flannel bandage, dipped in the melted paraffin. The paraffin may be melted in an ordinary little tin saucepan. After the flannel has been applied as far as is wished, it is to be allowed to set, and is then to be coated over with paraffin by means of a bristle brush. This is best accomplished by stirring the melted substance with the brush until it cools sufficiently to be slightly viscid; by this means a thicker and more uniform coat is obtained. When properly put on, the bandage has a peculiarly neat and clean appearance. Its advantages are that it is much lighter than any of the other substances used for the same purpose, that it is cleaner and cheaper, and that a supply of paraffin is almost everlasting; for after a bandage has served its purpose, it only requires to be boiled, and all the paraffin is got back. It takes up no fluid, and for this reason Dr. Heron Watson used it in preference to anything else in a case of fracture of the thigh in a child, where the greatest difficulty was encountered in keeping the little creature dry. In this case the success was perfect. The same gentleman has used it in a simple fracture of the leg successfully, and uses it together

with a straight outside splint as a stiff apparatus after operations for clubfoot. The property of not absorbing fluids renders it particularly useful in cases of compound fracture or any such condition where there is much discharge.

The only objection that I could imagine to its use was that it might be softened by summer heat; but this, I am now satisfied, does not occur. In a case of fracture of the humerus in which I applied it recently, the patient mentioned that it was a great relief to have it instead of the wooden splints in which his arm had been inclosed for some days after the injury.

Paraffin may be easily procured from any chandler, as it is now extensively used in its pure state as paraffin candles. By dissolving about a hundred grains of paraffin in an ounce of chloroform, and dropping a little of this on the skin to the extent required, a moderate amount of counter-irritation may be obtained. The mixture is simply allowed to dry on the surface, when the scaly paraffin may either be brushed off or allowed to remain as a protection to the irritated surface."—*Med. Times and Gaz.*, Nov. 3, 1866.

32. *Chlorate of Potash in Phagedæna.* By Dr. E. TILLOT.—Chlorate of potash has been employed for some years as an external application in ulcers, cancerous affections, and scorbutic gingivitis. It has been successfully used in the troublesome ulcerations following some blisters. It is daily used in the Hôpital des Enfants, in Paris, in the dressings of wounds covered with diphtheria. The chlorate may be used externally, either in solution, or as an ointment: in solution, in the proportion of ten to twelve grammes (a gramme is about fifteen grains) to six hundred grammes of water; as an ointment, two grammes to thirty of lard; and it may be mixed with glycerine. The mode of application differs according to the disease, and it may be by injection, lotion, or friction, once or twice a day. Dr. Tillot says that the chlorate has hitherto been very little employed in phagedæna, and as he has found it to produce a remarkable effect in this disease he thinks it interesting to communicate his experience of its effects. He relates six cases of phagedænic syphilitic disease, in most of which the chlorate was successfully employed; and he remarks that all the patients were free from constitutional cachexia, and were for the most part vigorous persons. In all of them the chancre was multiple, and belonged to the variety of *soft chancre*. The effects of the treatment were all manifested at the beginning of the medication; and although the contact of the chlorate was painful to bear, it was never so great as to compel its discontinuance. Its first effect, Dr. Tillot states, is to relieve the pains, when there are any; to diminish the intensity of the suppuration, and to modify its nature by changing the appearance of the morbid surface; but where it excels all other remedies is in its power of arresting the disease, in its spreading character. The action of the salt in phagedæna is not rapid, but it is constant.—*British and Foreign Medico-Chirurgical Review*, Oct. 1866, from *Bulletin Général de Thérapeutique*, March 30, 1866.

33. *Use of the Endoscope.*—The following remarks on this subject by Mr. CHRISTOPHER HEATH, of the Westminster Hospital, will be read with interest and profit:—

"I have been working with Cruise's modification of Désormeaux's endoscope for some months, and have latterly obtained very satisfactory results with it as regards diagnosis at least, for more time is necessary to test the treatment by means of the endoscope in all its branches. I have used Désormeaux's original instrument, as well as Cruise's modification of it; and I certainly give the preference to the latter, on account of the improved light, and the fact that it can be readily moderated as circumstances may require, although I think that Cruise's instrument might be simplified by doing away with the ratchet, etc., used to bring the lens opposite the flame of the lamp. This appears to me quite unnecessary; for, the lamp being fixed, the lens should be fixed too; and I find in my instrument (which I send you), that, having once raised the lens about a quarter of an inch, it requires no further adjusting, unless, indeed, as sometimes happens, it gets accidentally depressed in using the instrument.

"I have examined endoscopically a large number of cases of gleet, and can

confirm Désormeaux's statement that the majority of them depend upon a granular condition of the mucous membrane of the urethra at some point or other, and most frequently at the bulb. This granular condition frequently leads to a form of stricture of the urethra evidently due to the state of the mucous membrane: for, after treatment applied to the granulations by the topical application of a strong solution of nitrate of silver (gr. xx ad ʒi), the normal calibre of the urethra is restored, without the use of any form of bougie whatever. It is obvious that the recognition of this form of stricture (which, from what I have seen, I imagine to be far from uncommon) will necessitate a more accurate diagnosis and more varied treatment than is now generally adopted; and I think it not unlikely that those cases of stricture which have been satisfactorily treated from time to time, and specially by Mr. Wade, with the bougie 'armed' with caustic potash, have been instances of 'granular stricture'. Désormeaux believes, and I think with justice, that a simple granular stricture may in course of time develop into a *bonâ fide* condensation of the submucous tissue, and thus give rise to the more commonly recognized form of stricture.

"The diagnosis of an indurated, even of only very slightly contracted, portion of the urethra, by the endoscope, is very easy; and a very little practice will enable one to distinguish the sudden and uneven contraction of the condensed tissue upon the end of the tube, as contrasted with the uniform and gradual closure of the healthy urethra upon it, which so closely resembles the familiar closure of the vaginal or rectal mucous membrane upon the speculum. When the stricture is too tight to admit of the passage of the tube which is being employed, the face of the stricture is at once brought into view, and is very characteristic; the canal being sometimes narrowed to a minute central aperture, at others being more or less slit-like, and this slit having varying degrees of obliquity, as figured by both Désormeaux and Cruise in their illustrations.

"I have not had the opportunity as yet of ascertaining the exact site of the aperture in a case of impassable stricture; but I am quite confident that it would be possible to do so, as in the case related by Désormeaux, where he succeeded in passing a catgut bougie through a stricture which had failed the practised hand of Civiale. I have had the opportunity of examining one case of stricture after the use of Mr. Holt's dilator, and can confirm Dr. Cruise's account of the appearance presented. The case was one which admitted a No. 5 catheter, which endoscopically showed the canal converted into an oblique slit. After the operation, when No. 10 catheter could be readily passed, this slit was seen to be considerably increased, particularly at the upper part; and, on passing a tube through the stricture, it was seen that the mucous membrane beyond was paler than normal, and that the induration extended beyond the point where the stricture was split.

"With regard to the examination of the bladder, I found Désormeaux's angular tube so difficult to introduce, that I had a catheter and tube made upon the plan suggested by Dr. Cruise, which allows the bladder to be washed out, and the endoscopic tube to be used through the same instrument. With this I was able to examine the bladder of a man suffering from paralysis and consequent chronic cystitis, and was able to see very satisfactorily the congested condition of the mucous membrane. I last week had the opportunity of examining the interior of the female bladder in a patient of Dr. Ray, of Dulwich, and used for this purpose Désormeaux's tube most satisfactorily. This lady had been suffering from obstinate hæmaturia, and I was able to show Dr. Ray the anæmic condition of the mucous membrane in its greater part, and also a distinct growth springing from the left side of the bladder, and no doubt the source of the hæmorrhage.

"In conclusion, let me say that practice is needed in the use of the endoscope, as with every other 'scope'; and warn those who are short or long sighted to use their glasses when looking through the tube of the endoscope, or they may fail to focus the tissue at the end of it."—*British Med. Journal*, Sept. 15, 1866.

OPHTHALMOLOGY.

34. *Paralytic Ectropium successfully treated by Operation.*—MR. HAYNES WALTON records (*Brit. Med. Journ.*, Sept. 15, 1866) the following highly interesting case of this.

"A gentleman, aged twenty-four, was sent to me by Mr. R. Reid, in January of this year, on account of a distressing and increased ectropium of the left lower eyelid from facial paralysis on that side, which occurred in childhood. It is unnecessary to speak of the condition of the face. The ectropium produced much deformity, as the margin of the eyelid was very much depressed, and the conjunctiva was thickened and projecting, and very vascular. But a more annoying result was the constant flow of tears and mucous secretion over the cheek, roughness of the skin, and some excoriation.

"After a short examination I was convinced that I could render essential benefit, and my patient readily assented to my proposal of treatment.

"Chloroform having been given, I removed a strip of the diseased conjunctiva along the entire length of the eversion; and I may mention that I effected this by making two incisions with a scalpel, in the form of an ellipse, and dissecting away the isolated bit. It is by the contraction that ensues from this loss of substance that the eyelid is braced up, and in ordinary cases of ectropium I generally excise as much of the conjunctiva as is permanently exposed, and that effects the desired end. But here the lengthening of the tarsus, and the total loss of muscular support to it, required something more to be done; and also, the undue raising of the upper eyelid was another obstacle to success. To overcome these complications, I shortened both tarsi by removing a portion of each at the outer canthus, taking away conjunctiva as well, and brought the wound together by stitches.

"It is not necessary to give a detailed account of the progress. It will answer every purpose merely to tell that the repair was rapid, and as effectual as it was possible. The eyelids are nicely bound up, and the stare arising from the prominence of the eyeball, and the exposure of it is almost overcome; so little indeed remains, as not to be noticed by a casual observer. The punctum lacrymale in each eyelid having been returned to its proper position, the tears are thoroughly conveyed away through the proper channels. Withal, there is no trace or mark of the use of the scalpel."

35. *Cases Illustrating the Occasional Connection between Neuralgia of the Dental Nerves and Amaurosis.*—MR. J. HUTCHINSON compares certain cases of amaurosis with infantile paralysis; he says: "Certain cases of amaurosis appear to me to bear a very close resemblance to infantile paralysis. Without any warning whatever, without any other cerebral symptoms, a patient loses the sight of one eye; now and then, but only very rarely, of both. In some cases there is a certain amount of improvement afterwards, but often the amaurosis is total and permanent. In some instances the optic disk becomes white and atrophic, but in others it retains an almost normal vascular supply. Most of the subjects of those cases which have come under my notice are women. In some there is evidence of cardiac disease, but in others there is not, and in most I have found the arteria centralis of good size; so that the hypothesis of embolism seems to have but little support. In several of the best-marked cases that I have seen, there was the history of neuralgia in the face for long periods before the amaurosis, the neuralgia being usually connected with toothache. I am quite alive to some of the sources of mistake which attend the attempt to prove the occurrence of paralysis from reflex irritation consequent on a peripheral cause. Chief amongst them we have, of course, the possibility that the neuralgia itself may have been due to central disease, and that the extension of the latter may have implicated other nerves. I must leave the following cases to make their own impression on the mind of the reader. Whilst endeavouring to avoid forming hasty opinions, I may still venture the practical remark, that I believe we pay far too little attention to the state of the teeth as

possibly productive of disturbances of function, or of nutrition in the eyeball, or even in the cerebral centres of vision. . . . In the case of adults, it is surely the duty of our profession to take every opportunity of spreading information as to possible ill-consequences of retaining stumps in the jaw."—*Ophthalmic Review*, Oct. 1866, from *Ophthalmic Hospital Reports*.

MIDWIFERY.

26. *Age of Nobility*.—The *Edinburgh Medical Journal* for Sept. 1866, contains a highly interesting paper, by Dr. J. MATTHEWS DUNCAN, the object of which is to point out the ages within which women generally should enter the married state, if they are to be guided by physiological laws. Dr. D. does not consider puberty to be always contemporaneous with the age of nobility; the latter, he considers, to depend upon the age at which the pelvis reaches its full structural development in shape and form. He shows satisfactorily, that the mortality of first labours, and the fecundity of the female are to a great extent influenced by the age at which marriage takes place, and in conclusion, he expresses the conviction that "the age of about from 20 to 25 is the nubile age of woman." "Below 20 years of age," he says, "woman is immature, she runs considerable risk of proving sterile, and if she does bear a child she runs a comparatively high risk of dying in child-bed; besides, her early marriage brings many other disadvantages." The woman above 25 years of age is mature, but to counterbalance this, she encounters some greater risks than the very young wife's, though of a similar nature.

27. *Morbid Conditions and Injuries of the Spleen in the Pregnant and Parturient States*.—Sir J. Y. SIMPSON, at a meeting of the Obstetrical Society of Edinburgh (June 27, 1866), referred to three cases of fatal rupture of the spleen which had occurred respectively in the pregnant, parturient, and puerperal states. He pointed out the circumstance that, during pregnancy, there is often, if not generally, an increase of the white particles of the blood—or, in other words, a kind of normal or physiological leucocythemia. As in states of morbid leucocythemia, the spleen was often enlarged; so was it also occasionally in pregnancy. Perhaps it would be found in practice much more common than the silence of authors on the subject might lead medical men to suppose. It sometimes recurred in successive pregnancies. In one patient of his, the spleen became enlarged to a very marked degree in a series of successive pregnancies, and this splenic enlargement disappeared always after delivery. Her youngest child is now about ten years old, and during that time there has been no recurrence of the splenic hypertrophy in the mother. A certain amount of softening very frequently accompanies the hypertrophy of the spleen, and predisposes to the laceration of the organ under strong exertion and muscular effort, blows, etc. The first case of rupture of the spleen in a child-bearing mother which he saw was a patient of Dr. Husband's. She began to show symptoms of fatal sinking shortly after premature labor set in, about the sixth or seventh month. On opening the body after death, the enlarged spleen was found lacerated, with effusion of blood into the peritoneal cavity. Shortly afterwards, a patient of Dr. Wilson's, who had been delivered a week or two before, after making some unusual muscular exertion, complained of abdominal pain and sinking, and died. Rupture of the spleen and effusion of blood were found on dissection. The late Dr. Cunningham of Currie delivered a patient in Edinburgh, using the forceps. He left very shortly afterwards, to catch the railway train. The patient sunk and died within an hour or two. An inspection of the body was ordered by the law authorities when rupture of the spleen, and consequent effusion of blood were found to be the immediate cause of death.

Dr. Burn stated that Sir James Simpson had seen a patient of his lately where the spleen was very much enlarged during pregnancy. The patient died soon after her confinement.

Mr. Furley mentioned one case of a similar kind, where the patient died one hour after delivery.

Dr. Charles, of Calcutta, said he had seen many cases of different kinds where the spleen during pregnancy became enlarged and indurated. In one case, the spleen of a male patient was ruptured from throwing himself suddenly back in defending a blow. At the post-mortem examination the spleen was found ruptured, and of a red-currant jelly consistence. Such cases were common even from false steps, or in going down stairs. He thought such accidents were more common in India than here.

Dr. Wilson mentioned a case of ruptured spleen occurring shortly after delivery, which he had reported to the Medico-Chirurgical Society a number of years ago; and which he believes was reported in the *Monthly Journal* at the time.

Dr. Ritchie, of Derby, said he had seen cases of rupture of the spleen associated with bronchocele.

Dr. Keiller said that he generally found, in cases of splenic disease, that bleeding was difficult to stop, and he never advised leeching in such cases.

Dr. Sidey mentioned one case of enlarged spleen during pregnancy, where rupture followed an act of overstretching, and the patient died.—*Edinburgh Med. Journ.*, Sept. 1866.

38. *New Mode of treating Epithelial Cancer of the Cervix Uteri and its Cavity.*—Dr. ROUTH, in a paper read before the Obstetrical Society of London, (Oct. 3, 1866), after referring to the able papers of Mr. Moore on Cancer, said that the use of bromine as a local agent was first suggested to him by his colleague, Dr. Wynn Williams. Dr. Routh then related two cases admitted under his care at the Samaritan Hospital. In the first, the patient was thin, pale, and haggard, losing blood continually. There was a mass of fungoid epithelial growths, taking their origin from the os uteri, and about the size of an egg. The actual cautery was used to check the bleeding, and after the slough had come away a solution of bromine—five minims, to fifty of spirits of wine—was used. A piece of lint, the anterior surface of which was well saturated with the solution, was applied to the uterine diseased surface, and kept *in situ* by pledgets of lint. After forty-eight hours it was removed, and the part dressed at night with a poultice of lint dipped in warm water, and during the day warm douches were applied. In about a week a slough came away, and left a large healthy granulating surface. Tannin with glycerine was applied, and used daily. The patient also took internally the iodide of arsenic with extract of conium. After a period of ten weeks she was fat, hearty, and well-coloured; but as she occasionally lost a drop of blood, Dr. Routh carefully examined the internal surface of the uterus, and found about a quarter of its lining membrane affected with epithelioma. She left the hospital for some weeks, and on being readmitted a piece of wood about the size of the uterine cavity was prepared, and covered with cotton; the upper part was dipped in a saturated solution of carbonate of soda, the lower in the bromine solution, and it was passed up and left within the uterus. Two or three further applications of bromine with glycerine were necessary, and the patient left the hospital with a movable healthy uterus.

In the second case there was a large carcinomatous mass, about the size of an orange, attached to the os, which appeared to be large cauliflower excrescences, breaking down readily and bleeding at the slightest touch. On January 20 the mass was removed by the wire *écraseur*, and a few days afterwards the spirituous solution of bromine was applied. She took internally the iodide of arsenic and conium, and was treated in the same manner as the first case. She left the hospital on April 2, with a movable uterus covered with healthy mucous membrane, and looking herself fat and hearty.

The author remarked that he was quite aware that two cases afford an insufficient criterion as to the value of any remedy, and that time had not been allowed to prove that the cures were lasting. Notwithstanding these objections, he thought, at the same time, there was some considerations which made an early publication of these cases desirable. The author concluded by drawing

attention to the care necessary in mixing the bromine with the spirits, which should be done very gradually, to avoid an explosion. He hoped others would try the agent he now brought forward, and give the results of their experience. He believed it to be a potent and useful remedy, and likely to prove of service, if not in the cure absolutely, at least in the arrest of the progress of cancer.—*Med. Times and Gaz.*, Nov. 3, 1866.

39. *Clitoridectomy*.—The following testimony of Dr. CHARLES WEST against the utility or propriety of this operation will be read with interest:—

"1st. Having for the past twenty-five years seen more of the diseases of children and young persons of both sexes than most members of my profession, and as much as most of the diseases of women at all ages, I believe that masturbation is much rarer in girls and women than in our own sex.

"2d. I believe the injurious *physical* effects of habitual masturbation to be the same as those of excessive sexual indulgence, and no other. The special *physical* harm done by masturbation I believe to be due to the fact that it can be indulged in at a much earlier age than sexual intercourse, and can be practised with much greater frequency.

"3d. But, nevertheless, I have not in the whole of my practice seen convulsions, epilepsy, or idiocy *induced* by masturbation in any child of either sex; a statement, I scarcely need add, widely different from the denial that epileptics or idiots may, and not seldom do, masturbate. Neither have I seen any instance in which hysteria, epilepsy, or insanity in women after puberty was *due* to masturbation as its efficient cause.

"4th. I *know*, and I can appeal with confidence to the knowledge of many members of the medical profession, that of the alleged cures of hysteria, epilepsy, insanity, and other nervous diseases of women by excision of the clitoris, a very large number were not permanent. I further *know* that in several instances, one of which, seen by me in consultation with Mr. Paget, is related at p. 663 of my lectures, very mischievous results have followed it.

"5th. Although the moral questions involved in the practice of masturbation are not strictly within the province of medicine, yet, as the quotation from my lectures, taken apart from the context, may appear to imply that I believe the mind could be restored to its purity by any means which our art might furnish, I must add that I hold no such opinion.

"We too often see the man in whom desire has outlived the power of performance for the dream to be possible that there is any necessary connection between infirmity of body and purity of mind; and most of your readers do not need to be reminded that the judgment of the Church as well as the sympathy of all are with the struggle and self-conquest of St. Jerome rather than with the voluntary mutilation of Origen.

"6th. Whilst I believe the removal of the clitoris in cases of hysteria, epilepsy, insanity, and other nervous diseases of women to be a proceeding theoretically based on erroneous physiology, and practically followed by no such results as to warrant its frequent performance, I regard it as completely unjustifiable when done for the alleged relief of dysuria or of painful defecation, for the cure of amenorrhœa, or for the mitigation of the symptoms of uterine misplacement or disease.

"7th. I consider that public attempts to excite the attention of non-medical persons, and especially of women, to the subject of self-abuse in the female sex are likely to injure society, and to bring discredit on the medical profession. I think that such attempts are the more objectionable when associated with a reference to some peculiar mode of treatment and alleged cure practised by one individual.

"8th. I believe that few members of the medical profession will dissent from the opinion that the removal of the clitoris without the cognizance of the patient and her friends, without full explanation of the nature of the proceeding, and without the concurrence of some other practitioner selected by the patient or her friends, is in the highest degree improper, and calls for the strongest reprobation."—*Lancet*, Nov. 17, 1866.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Case of Fracture of the Thyroid Cartilage and the Lower Jaw. By PHILIP S. WALES, M. D., Surgeon U. S. Navy.

J. W. S., age 30, born in Massachusetts, admitted May 2d, with a severe compound fracture of the inferior maxilla, implicating its anterior third, the fragment of shell producing it passing through the floor of the mouth, making an ugly lacerated wound, and coursing over the neck obliquely to the middle of the right clavicle, causing its fracture (compound). There was profuse hemorrhage from the mouth, which was checked by persulphate of iron; the patient can only speak in a whisper. Applied water dressing, and a light retentive bandage composed of a few turns of a roller to hold the fragments of bone together.

May 4. Removed three large fragments which, it was evident, would not consolidate from being almost entirely separated from the maxilla. There is emphysema over the clavicular fracture, leading all the medical officers to agree with me in the opinion of the probability of a penetrating wound of the chest.

5th. The tongue is considerably retracted towards the throat from the destruction of the origin of the muscles which thrust it forwards; still whispering voice, attributable to jaw injury; has some fever. Gave neutral mixture with spts. ætheris nit.

6th. The patient looks badly; several pieces of shell were removed from the face to-day; he complains of oppression in the chest, near the wound. Stimulants given freely.

7th. Is worse; required constant watching last night; cannot articulate distinctly; is evidently doomed to die. 3 P. M. Died.

Autopsy ten hours after death.—Laceration of floor of the mouth and comminution of inferior maxilla. *Chest.*—To the surprise of all, the right lung was found perfectly healthy, the fracture of the clavicle not communicating at all with the cavity of the chest; search was then made to discover the cause of the emphysema surrounding it, and a remarkable fracture was found passing through the right wing of the thyroid cartilage beginning at a quarter of an inch from the pomum Adami upon its upper border and extending downwards and backwards to its lower border; there was ecchymosis of the mucous membrane of the laryngeal ventricles, and the space of an inch below them was red. I should observe here that this fracture caused no displacement of the respective parts of the cartilage, and was as clean as if done with a knife, or like a fissure extending through a glass plate; there was no emphysema over or in the neighbourhood of the larynx to lead me to suspect a lesion of this organ. The whispering, and afterwards inarticulate voice, could well be accounted for by the jaw injury; the oppression of breathing, pain in the chest, and emphysema over the fractured clavicle, naturally indicated the chest as the seat of the principal trouble.

Case of Fractured Skull with Loss of Brain: Recovery. By J. M. SNYDER, M. D., Maple Row, Romney, Hampshire Co., West Virginia.

On the 15th of April, a son of Col. Fox, about eight years old, was run over by a horse and thrown violently upon a jutting rock, which fractured the skull extensively. About two hours after the accident I was called to the case, and upon examination found the injury to be at the middle portion of the temporal arch, between the parietal protuberance and frontal suture, implicating a portion of the frontal bone. A portion of the parietal bone one inch and a half in length and of an elongated triangular form, was forced endwise into the middle lobe of the brain, penetrating its investing membranes and entering its substance.

Parts of the parietal, frontal, and temporal bones were fractured into five and six pieces, making a comminuted, depressed space of four inches, which presented a concave appearance, with a wound in the centre of the depression about one inch in length. After removing the hair and enlarging the wound to the extent of two inches to facilitate the extraction of a portion of the parietal bone completely hidden in the cerebral mass, I extracted the piece of bone with forceps, and removed about a tablespoonful of the middle lobe of the brain, which followed the extraction of the bone. After this the little fellow aroused up, and made a considerable struggle to rise, but was held quiet by assistants. The struggle caused a second protrusion of the brain, which being detached from the cerebral mass, as I supposed, was cut away with the surgeon's scissors.

I then proceeded to raise with an elevator the depressed pieces of bone to their normal position, which was accomplished with considerable difficulty, and not without a good deal of force. It was, however, by perseverance, accomplished satisfactorily, when the wound was dressed with adhesive plaster, and a light compress, leaving a small space between the strips to permit the blood, &c. to escape.

During the operation the little fellow was perfectly comatose, except for a moment immediately after the removal of the bone. He was now placed in a well-ventilated and quiet apartment, closely watched and under the constant surveillance of a doting mother. Although a very tractable and obedient child, yet it was necessary for those around him to watch him closely, as his position was frequently and abruptly changed from side to side with quick and sudden tossings. He frequently placed his hands on the wounded part, but complained of very little pain. He was very closely watched during the night and next day by myself, and on the following night, about thirty hours after the operation, reaction took place, which required for the protection of the brain three copious bleedings about an hour apart.

This free abstraction of blood had the desired effect of reducing arterial action and quieting the whole system.

On the following day I deemed it proper to excite the bowels to action, which was done by enemata, and subsequently by giving quarter minim doses of *ol. croton tiglii* mixed with bread crumbs, repeated every two hours until some effect was manifested. After this an occasional pill of the same was given, which by one or two repetitions always acted pleasantly and kept the bowels in a soluble condition. No further evidences of excitement manifested themselves during the progress of the case.

The head and wound were washed, cleansed and dressed twice a day for a few days, and subsequently but once a day, and recovery was unexpectedly rapid, in three weeks he being able to walk in his room, and the little fellow is now (October, 10th) in robust health and fine spirits.

In this case I feared the occurrence of fungus cerebri, but this unpleasant consequence has not taken place, and probably will not, as it is now five months since the accident. I feel confident the boy's intellectual faculties have not sustained the slightest degree of injury.

On the 16th of August, four months after the accident, he had an attack of scarlatina simplex which passed off without an unpleasant symptom, and without any medical treatment other than a tepid bath and confinement to his room.

Pruritus Pudendi successfully treated by Sulphite of Soda. By SAMUEL B. FRIZELL, M. D., of Grangerbury, Ohio.

In September, 1866, I was consulted by a lady suffering from pruritus pudendi following menstruation—accompanied with great irritation and much pain.

Having read of the influence of sulphite of soda on sycosis menti, the idea suggested itself to me of trying the same in this case. I accordingly prescribed for her the following local application: Sodæ sulphis ʒj, aquæ ʒiij, glycerinæ ʒj, M., which was to be used quite often. In three days no trace of the disease was apparent.

Tænia Solium successfully treated by Turpentine. By CHARLES C. SHOYER, M. D., of Leavenworth, Kansas.

A clergyman, who had been troubled with tænia for four and a half years, and had been subjected to various remedies, applied to me. I ordered half an ounce of Ol. terebinthinæ to be taken at 10 A. M., fasting, and a half ounce at 1 P. M., an interval of three hours; directing half an ounce of Ol. ricini at half past one o'clock; this last was superfluous for in ten minutes after taking the second dose of turpentine the worm was expelled entire, in a mass, and proved to be fifteen feet long. The remedy caused slight intoxication and strangury which speedily passed off.

Two Cases of Poisoning by over-doses of the Fluid Extract of Gelseminum. Reported by REZIN P. DAVIS, of Parkersburg, W. Va.

On the evening of October 6th, 1866, I was called to visit Mr. C. H. B., a young lawyer of our city, who was reported as being very ill. I answered the call immediately, and found him in the following condition:—

He was lying upon his left side, face somewhat congested, pupils dilated, but responding to the different degrees of light; eyelids half closed, with apparent inability to move them; lower jaw drooping, and his tongue, to use his own expression, "was so thick he could hardly speak;" his skin was warm and moist; pulse small and feeble, and his respirations somewhat diminished in number. He had neither purging nor vomiting.

Upon my questioning him as regards his condition, he told me that "he and a friend had been enjoying themselves in a social way for some three or four days," and that nothing was the matter with him now "but extreme nervous prostration." He also told me that he had not taken medicine of any kind. Thinking, as he did himself, that he was merely prostrated from excessive dissipation (he being of a very nervous and delicate constitution), I ordered him a brandy punch, and went to the drug store for some medicine.

Whilst waiting for the prescription to be filled, his friend Mr. S. came staggering into the store, saying, "I am blind; I cannot see. What in the world is this I have taken? (at the same time showing a bottle). My

friend B. is down town in the same fix." I examined the bottle, and found it plainly labelled "Fluid Ex. Gelseminum." I asked him how much they had taken? He replied, "B. and I have each taken a tablespoonful." I immediately sent my student, Mr. White, to see Mr. B. and give him an emetic, with other remedies to be given after he had vomited. I then gave Mr. S. an emetic which acted freely; after which I gave him quin. sulph. ζj in spt. vin. gal. ζiv . In a few minutes Mr. White returned and said Mr. B. was dying; and that it was with great difficulty that he got him to swallow the emetic, which had not acted. Dr. A. G. Clark accompanying me, we hastened to where Mr. B. was, and found him in a dying condition, pupils widely dilated, spasmodic breathing, surface cold and congested, pulse almost imperceptible, and totally unconscious. Mustard was applied to the extremities, his body sponged with hot brandy, and artificial respiration, but all to no effect. He died at 8.30 P. M., about two hours and a half after he had taken the poison.

I returned to Mr. S.; found him still inclined to sleep, with deep inspiration, and a numbness of the whole body. I repeated the quinia and brandy, but in only one-half the quantity given before, and kept him walking about, with the aid of two of his friends. At ten o'clock he was feeling quite comfortable. Considering him out of danger, I sent him to bed, when he slept soundly all night, waking in the morning feeling, as he said, "quite well, but weak and dizzy." He recovered without any further difficulty.

The fluid extract taken by the above parties was prepared by Tilden & Co., New Lebanon, N. Y. There being no antidote to poisonous doses of gelseminum given in the U. S. D., I was at a loss to know how to act and what to do. But acting upon general principles, I first vomited Mr. S. freely, and then gave him the large doses of quinia spoken of above. My reasons for giving the quinia were these: gelseminum being a powerful nervous sedative, when taken in large quantities, acting upon the brain and nervous system generally, and quinia being a cerebral stimulant, I thought that large doses of quinia might rouse the nervous centres to action; through this to restore tone and vigour to the heart, and equalize the circulation. I am satisfied that the quinia had a good effect, for Mr. S. had taken the gelseminum nearly ten hours before he took the emetic, giving the system time to come thoroughly under its influence. I am satisfied that had Mr. S. waited, and sent for a physician, that he would have shared the same fate as his friend and companion; that the time lost in so doing would have placed him beyond the reach of medical assistance.

Poisoning from Oleum Tiglii. By CHARLES C. SHOYER, M. D., Leavenworth, Kansas.

Some time ago I ordered ol. tiglii ζiij , ol. olive ζj , as a counter-irritant. This mixture was accidentally spilt over some pigeons and chickens cleaned and ready to be put on the fire. After being thoroughly washed in several waters they were thought fit to eat, and were prepared accordingly. Five persons in all partook of the meal, aged respectively, mother, 54 years and feeble, young lady of 15, girl 9, and two young sons of 17 and 19. I was sent for and learned the above; in addition, I found there was great anxiety and burning in the mouth and throat; this was about an hour after the meal. I informed them that violent purgation would probably be the only ill consequence, and that the mother would suffer most. Left a prescription for tr. opii deodorata, of which the youngest was to take 3 drops and

the others 10 drops every hour or two, according to the severity of the purging; all were to drink milk and keep quiet. The purging occurred and was relieved by the remedies. The next day early, after an interval of 18 hours from the accident, the mother was again attacked with purging, and while at her work felt a burning in the throat and mouth, and there were some pustules to be seen in the latter; she became faint, and commenced to vomit; there were muscular tremors and great general prostration. I found a very feeble pulse, slight tenderness of the abdomen, but none of the epigastrium; tongue white, showing impress of the teeth; feet cold, skin moist, mind clear. The vomiting continued an hour; the ejected matter was light and glairy, not tinged with bile, and contained no food. During vomiting, and for two hours after, there was a constant tendency to faint, and a deathly, indescribable feeling of prostration. Treatment consisted of flannels wrung out of hot water to the abdomen; large sinapism to the epigastrium; warmth to the feet; 10 drops of tr. opii deodorata every half hour in whiskey and water, and a liberal use of the fan. In four hours the patient was as well as ever, but very weak. Ordered as nourishment milk toast and farinaceous articles prepared with milk. At this writing, 55 hours since the accident, and about 30 hours since the last treatment, the patient is up and about.

Deficiency of the Integuments of the Abdomen and Spina Bifida in the same Child. By D. N. RANKIN, M. D., of Alleghany City, Pa.

Mrs. S., after an easy labour, was delivered on the 29th of September, 1866, of a good-sized and living male child, deformed in a very remarkable manner. The integuments, as the skin, muscles, and fascia, were entirely wanting in the front part of the abdomen, extending from two to three inches above the umbilicus, down as low as the usual outlet of the alimentary canal. The contents of the abdomen projected so much as to produce the appearance of a large umbilical hernia, covered in its upper part, by the peritoneum only, which membrane extended down as low as a line drawn across the body, on a level with the anterior superior spinous processes of the ilium.

The umbilicus was in its natural position, and had attached to it a very short umbilical cord.

The lower part of the projecting mass was entirely denuded of peritoneum, as well as of all other integuments. The testicles stood out stiffly on each side of the penis; these, as well as all the other parts in the neighbourhood, being entirely bare of integument, had the appearance of a confused mass of raw flesh.

Besides the hideous aspect exhibited by the front part of the body, the back also came in for its share of abnormal conformation; for opposite the lower lumbar vertebra there existed a large tumour of the nature of hydro-rachitis or spina bifida.

As far as could be discovered this child breathed quite naturally, and showed indications of living for some little time at least; but judging from the great deficiency in its organization, it could scarcely be expected that its life could be prolonged to any very great extent.

During the first seven or eight days of the child's life, the mother not having any milk, it was fed with a spoon on cow's milk and water, which it took as freely as most newly-born children do. During this early stage of its life the evacuations from its bowels and bladder were normal. It lived twelve days, but during the few latter days of its existence it

took no nourishment, and exhibited symptoms of intense suffering, no doubt from the effect of inflammation in the exposed parts. An oozing of blood from the raw surface continued during the whole period of its short existence.

A post-mortem examination of this singular freak of nature would have been very desirable, but from unavoidable circumstances this was rendered impracticable.

Case of Rupture of the Uterus. Reported by B. H. CATLIN, M. D., of Meriden, Conn.

Mrs. Ann C., aged 40, was taken in labour with her seventh child, about 10 o'clock A. M., July 7, 1856. I was called about 1 P. M., and found her sitting up, in good spirits, with regular pains every four or five minutes. I anticipated no danger, having attended her in her six previous labours, which were perfectly natural and regular, though she always suffered more from strong pains than the majority of women. I soon made an examination, and found the first stage of labour completed—the head presenting in the first position. The labour progressed favourably, though not rapidly, till the head had passed the superior strait, when a very severe propulsive pain came on, which continued till the child was born, and even then there was no abatement of her suffering. I supposed, at the time, that the distress after delivery was from the shock to the system occasioned by such a violent pain and rapid delivery. According to my custom, in all cases of delivery, as soon as the child was put into the hands of the nurse, I placed my hand upon the abdomen, and found the uterus firmly contracted. I directed an attendant to give the patient some camphor and water, while I took hold of the cord. In a few minutes the placenta was thrown off by the pains. As my patient obtained no relief from her suffering, I administered a full dose of morphia, followed by stimulants, but as there was no improvement, and she was sinking very rapidly, I examined first with the finger, then introduced my hand, which passed through a rupture of the uterus among the intestines. Her situation seemed now hopeless, but as it was a very unusual case I requested her husband to call in my neighbour, Dr. E. W. Hatch, who made an examination. The patient never rallied, but died about thirty or forty minutes after delivery, and about four hours after I first saw her.

This is the only case of rupture of the uterus that has occurred in my own practice of over forty-one years. In the few cases I had heard of in our State the patients had died undelivered, or after the use of artificial means, and I was not aware at the time that any patient was ever delivered by the pains when a rupture occurred. After this I examined the cases reported by James D. Trask, M. D., in the fifteenth and thirty-second volumes of this *Journal*. Dr. Trask writes (vol. fifteen, p. 403): "Of 31 delivered by natural efforts, 20 died and 11 survived, and these include in both instances cases of rupture of the os in which the peritoneum was not involved." In the cases reported in the thirty-second volume I have counted 9 cases of natural delivery, making 40 cases in 418 reported.

My patient gave no sudden outcry, nor complained of any tearing sensation. The rupture was in the posterior part of the uterus near its connection with the vagina. I regret that we neglected to make a *post-mortem* examination. The patient was of a strumous habit; had a scrofulous tumour on the neck, but during her last pregnancy she had been unusually well. The child was born alive, but it was feeble, and died in forty-one hours.

Strictures of the Urethra.—Our venerable and highly esteemed correspondent, Dr. JNO. P. METTAUER, of Prince Edward Court House, Virginia, writes to us: "I have been treating strictures of the urethra for over thirty years, and I have cured every case, now over 400. I incise and dilate, and my modes of operating are intra-urethral and by the Rapho-perineal section. This last mode I first practised in 1836, during which year I treated two cases upon this plan, and how long before Prof. Syme operated I leave you to judge. I have living witnesses to prove my operations in 1836."

DOMESTIC SUMMARY.

Sickness and Mortality in the U. S. Navy during the year 1865.—We have been favoured with a number of highly interesting statistical tables which form part of the forthcoming Annual Report of Dr. P. J. HOGWITZ, Chief of the Bureau of Medicine and Surgery of the U. S. Navy. We regret that the limited space at our disposal now, allows us to give only the general summary.

The following table contains a summary of the general results:—

	Aggregate number of officers and men on board of vessels in 1865.	Remaining sick Dec. 31, 1864.	Admitted in 1865.	Discharged in 1865.	Died in 1865.	Total treated in 1865.	Remaining sick Dec. 31, 1865.	Proportion of cases to number of persons on board.	Proportion of deaths to whole number of persons on board vessels.	Percentage of deaths to whole number of cases treated.
Hospitals . . .	...	1,015	6,933	7,140	388	7,928	400	...	...	.648
Navy-yards, &c.	...	61	4,274	4,218	32	4,335	85	...	...	.007
Receiving-ships	3,241	64	2,560	2,544	30	2,624	50	.80	.009	.011
Vessels in commission at sea	29,400	1,531	36,545	37,278	480	38,076	318	1.29	.016	.012
	32,641	2,671	50,292	51,180	930	52,963	853	1.62	.028	.017

Casualties in the navy during the rebellion.—The total number of persons injured from gunshot wounds, or from the explosion of gunpowder, in the navy, from April 12, 1861, to June 30, 1865, received in engagements with the enemy, is, as far as the bureau can ascertain, 3,266; of these 440 persons received two or more wounds at the same time.

From casualties incident to the service, not connected with battle, during the same period, there were 2,070 cases, of whom 148 sustained more than one injury at the same time: the aggregate number of lesions being 2,286.

The tabular statements appended to this report show the number of each class of wound or injury, amputations, excisions, &c., together with the results.

Insane of the navy.—On the 30th of September, 1865, 4 officers, 5 seamen, 1 marine, 1 landsman, and 1 pensioner—12 in all—remained under treatment in the Government Hospital for the Insane near this city.

“During the year ending September 30, 1866, there were admitted	
3 officers, 1 seaman, 3 landsmen, 1 coal-heaver, and 3 beneficiaries—total 11; the whole number under treatment during the year	23
The discharges in the course of the year were, by recovery, 1	
seaman, 1 coal-heaver, and 1 pensioner—total	3
By death, 1 officer	1
By elopement, 1 landsman	1
	— 5
Leaving in the institution, on the 30th of September, 1866, 6 officers, 5 seamen, 1 marine, 3 landsmen, and 3 beneficiaries—total	18.”

There are some highly interesting tables showing the number and results of gunshot fractures and injuries of bones and great cavities; number of amputations and excisions, with results; cases of paralysis from gunshot and other injuries; cases of ligation of arteries from gunshot and other injuries; cases of traumatic aneurism from gunshot and other injuries, &c. &c. &c.

“At the close of the year 1864 there remained under treatment 2,671 cases; during the year 1865 there occurred 50,292 cases of disease, injury, &c., making a total of 52,963 cases treated during the year, of which number 930 died, 51,180 were returned to duty or discharged the service, leaving 853 cases under treatment at the end of the year 1865.

“The average strength of the navy (officers, seamen, marines, engineer service, and coast survey included), for the year 1865, as nearly as can be ascertained, was about 32,641.

“The proportion of cases admitted to the whole number of persons in the service was about 1.62, or each person was on the sick-list $1\frac{62}{100}$ times during the year. The proportion of deaths to the whole number in the service was .023, and the percentage of deaths to the whole number of cases is .017, or less than two per cent.

“The total number of deaths from all causes reported at the Navy Department from October 1, 1865, to September 30, 1866, is 394.”

This small mortality, less than 2 per cent., is highly creditable to the medical staff of the navy, and demonstrates the skill and care bestowed on the sick and wounded. No other naval service in the world embraces a larger proportion of highly educated, skilful, and conscientious surgeons than our own, and all that is now wanted is a proper recognition of their important services, by bestowing on them adequate rank and emoluments to stimulate them to higher cultivation, and to secure to the service the most intelligent minds in the profession.

Use of the Thermometer in Diagnosis and Prognosis.—The No. of the *New York Medical Journal* for November last contains some interesting remarks by Prof. AUGUST FLINT on the thermometric phenomena of disease, a subject which has latterly engaged the attention of clinical observers in Germany and Great Britain. The following propositions contain the substance of his remarks:—

“1. The thermometer is indispensable for obtaining accurate information of the temperature of the body, the perceptions of patients and the sense of heat or coldness communicated to the hand of the physician being alike fallacious.

“2. In the essential fevers and all acute affections, the heat of the body is more or less above the maximum of health; and the increase of heat, as a rule, persists during the career of the disease. Fevers and acute affections may, therefore, be excluded by the fact of the heat of the body remaining within the limits of health; and the existence of an essential fever or an acute affection of some kind may be predicated on a persistent increase of heat.

“3. A fever is purely malarial, that is, it is not a continued fever, nor is it associated with a continued fever, if, between the exacerbations, the temperature fall nearly or quite to the range of health.

“4. The diagnosis of neuropathic affections which simulate inflammations may be based on the fact of the temperature not being raised.

“5. Coma from uræmia may be discriminated from the coma occurring in fevers or dependent on meningitis, by finding the temperature not raised; and

in cases of uræmia, coma, and convulsions, intercurrent inflammatory affections may be excluded if the temperature remain normal.

"6. In tuberculous affections, when tuberculization is going on, there is more or less increase of heat. In cases of suspected tuberculosis, a normal temperature shows either that tuberculosis does not exist, or, if existing, that it is not progressive.

"7. In cases in which the history and symptoms excite fears of the existence of meningitis, the existence of this disease is not probable if the temperature be not increased; and, on the other hand, increase of temperature sustains these fears, provided the patient have not an essential fever.

"8. The amount of increase of heat, as shown by the thermometer, provided the increase be not transient, is proportionate to the gravity of the disease, and is a criterion of the immediate danger. A persistent temperature of 105° always denotes great severity of disease, and a still higher increase renders it almost certain that the disease will speedily prove fatal.

"9. The temperature in the different essential fevers and inflammations is governed by certain laws as regards progressive increase, daily fluctuations, and the rapidity or slowness with which it returns to the normal standard (deferrescence) of the time of convalescence. Each essential fever or inflammatory affection has its own laws in respect of the points of difference just named; and any notable deviation from these laws, in individual cases, is an unfavourable prognostic. Thus, a decrease of heat below the normal range may indicate an internal hemorrhage, and a sudden increase may point to an important complication or the occurrence of an intercurrent affection. Mildness of the disease, and the absence of complications or intercurrent affections may, on the other hand, be predicated on the disease pursuing its regular course as regards temperature.

"10. The surest evidence of convalescence from an essential fever, or an acute inflammation, is a return of temperature to the normal standard. If an increase of temperature persist, after apparent convalescence, or, in self-limited affections, after they have reached the end of their career, either morbid conditions pertaining to the disease continue, or some affection has been developed as a sequel of the disease."

Comparative Merits of Incision and Dilatation of the Mouth of the Womb in cases of Dysmenorrhœa.—Prof. D. HUMPHREYS STORER read, in August last, a highly interesting paper on this subject before the Boston Society of Medical Improvement. The large experience and sound judgment of Prof. Storer not only entitle his opinions to a respectful consideration, but his conclusions to entire confidence. He says: "From a somewhat extensive employment of sponge-tents during the ten past years for the treatment of dysmenorrhœa and sterility, I have formed conclusions different from those of the gentlemen of whom I have spoken [Drs. Barnes, Baker Brown, Greenhalgh, and Sims]. I have not unfrequently been disappointed in the result hoped for. The local obstruction has almost always been overcome by the long-continued, persevering employment of the dilator; but the opened canal does not always remove the condition thought to depend upon its closure—dysmenorrhœa and sterility still remain. I have, however, never seen the ill effects spoken of from the employment of tents. I cannot recall a single instance where more than a few hours' inconvenience has been produced; and in such cases the expanded sponge, when removed, has proved to have been originally much larger than it was supposed to be—showing that he who employs these tents should be acquainted with their uncompressed dimensions. My experience has taught me, then, that these contractions, however firm they may be, may almost invariably be overcome. The physician need not feel that the part is undilatable because the application of three, or five, or half a dozen tents does not overcome it; in a case occurring in my practice, about a year since, *eighteen* sponge-tents were introduced at intervals of two and three days before the canal was opened. My perseverance was rewarded by the perfect relief of the patient. I could point, were it necessary, to several cases where, after years of sterility, the sufferer has been relieved and borne children, and in the intervals of their childbearing have suffered no dysmenorrhœa. I have repeatedly seen cases of

dysmenorrhœa remain relieved for years, and known no return. In a word, I have relied upon dilatation to relieve these affections, and whatever opinions may be advanced by others, so long as I feel we have a remedy from which we can confidently expect relief, and very rarely observe any injurious effects, I shall feel it my duty to employ it.

"That cases do occur where the difficulty *cannot* be removed by dilatation, there can be no question; but 'that incision is the only efficient and permanent remedy (in most cases) for dysmenorrhœa,' I unhesitatingly deny.

"Let us for a moment look at the method proposed. Those who advocate it should of course be satisfied that it has superior claims over the means now employed. I have thought the ill effects produced by *distension* might be occasioned by want of care; but those arising from incision *may* follow the operation of the most skillful surgeon who advises it, when the metrotome cuts through the walls of the *inner os*; and Dr. Barnes states, to employ his own language, 'there is no doubt that the surgeon has actually cut through the substance of the uterus, and wounded the plexus of vessels outside; hence severe and dangerous hemorrhage has ensued, and inflammation of the perimetrium tissues.' And even supposing the operation should be successfully performed, it is acknowledged by Dr. Routh, one of its advocates, 'that such an amount of contraction frequently exists as to render it necessary to have a dilating substance worn for a considerable length of time to prevent its perfect occlusion;' and Dr. Williams observes that 'oftentimes no relief is afforded. He had seen a patient whose cervix uteri had been slit up on both sides, forming two large protruding lips, without affording any relief to the sufferer.' Where the external os has been almost cartilaginous to the feel, I have overcome the obstruction with the hysterotome; but I have never attempted to divide the internal os. I cannot, however, recall the instance where it was required."—*Boston Medical and Surgical Journal*, September 27, 1866.

Cholera.—The *Cincinnati Lancet and Observer* of November last contains a very interesting report made to the Board of Health of Cincinnati, by Dr. ROBERTS BARTHOLOW, Consulting Physician to Mercy Hospital, from which we will make a few extracts. He confirms the views elsewhere (*Med. News*) expressed by us on some important points.

"*Ejecta.*—No cases of *cholera sicca* were admitted. All had the characteristic discharges by stool or vomit, and, with one exception, by both. The gravity of the phenomena appeared to depend to a great extent upon the quantity of the discharge; *ceteris paribus*, those cases proceeded to a fatal termination most rapidly, in which the rice-water evacuations were most abundant.

"The discharges were alkaline. They consisted of a serous fluid, almost identical with the serum of the blood, columnar epithelium, and *debris*. Vibrations were not observed in a single instance.

"The urine was suppressed in all cases of collapse, and very scanty in the first and second stages of the disease. A direct ratio existed between the severity of the case and the amount of the urinary secretion. The specific gravity fell with the diminution in the amount, and albumen, epithelium, and tube casts appeared early and increased rapidly in quantity. I have not been able to note the condition of the urine before the accession of cholera symptoms, but the changes in the amount of its normal constituents and the appearance of abnormal ingredients, were manifest in the very inception of the diarrhœal stage—a fact of importance, equally in a diagnostic and therapeutical point of view.

"The perspiration was neutral or feebly alkaline. In the cases of consecutive fever with suppression of urine, a distinct urinous odour was perceived in the sweat.

"The alkalinity of the rice-water discharges, of the perspiration and the rapid diminution in the acidity and finally, the alkalinity of the urine, are very notable facts in the clinical history of the disease. * * * *

"*Morbid anatomy.*—The small intestines were generally well filled with flatus and rice-water matter, and were universally injected, minute vessels not ordinarily visible to the naked eye, having attained considerable size. The mesenteric vessels were also enlarged. In consequence of this increase of size it was

quite possible to trace the distribution of the vessels through the submucous coat and mucous membrane, to the capillary ramification. Remarkable and characteristic alterations were found in the epithelial layer of the mucous membrane. At the earliest period these alterations consist in a remarkable proliferation of the columnar epithelium and the production of degenerate forms. The villi are matted together by the new matter thus produced, and it adheres with more or less tenacity, all along the intestinal tract. Examined with a power of 300 diameters linear, this matter is seen to be composed of columnar epithelium, lower cell forms, occasionally a villus, and differs from the rice-water discharges in containing a much less amount of serum. In many parts of the intestine, especially in the ilium, nothing remains on the basement membrane, but this adhesive matter. After death by consecutive fever, large tracts, of the ilium especially, are found stripped to the basement membrane. There is in either case nothing intervening between the vessels of the submucous coat and the contents of the intestine, but the homogeneous, structureless basement membrane—for the cast-off epithelium is excrementitious matter. It is obvious that this destruction of the columnar epithelium arrests that vital power of selection and transference to the lacteals and veins, possessed by these cells. An outward diffusion current would therefore appear to be inevitable, and hence, the extraordinary congestion of the veins consequent upon the outward flow.

“Coincidentally with these alterations in, and destruction of the columnar epithelium, the glandular apparatus of the small intestines becomes the seat of equally striking changes. The solitary glands enlarge, become filled with a milky fluid, and the patches of Peyer thicken. The mesenteric glands, also, enlarge somewhat. The solitary glands of the large intestine undergo similar changes. The liver is unaltered, except in the cases of consecutive fever. The gall-bladder contains bile in the usual quantity, and there is no obstruction to the entrance of it into the intestine; indeed, in almost every case bile was found in the small intestine, but unaltered in its physical and chemical characters. These changes in the columnar epithelium and in the glandular apparatus of the intestines, have the effect to arrest, at once and completely, the digestive process, and hence no feces are formed, although bile is present and appears at times in the discharges.

“The arrest of the primary assimilation and the rapid loss of the serum, occasion serious changes in the blood. To study these changes most satisfactorily, it is necessary to compare the blood of the portal vein, just despoiled of many of its constituents by the outward drain through the intestine, and the blood of some remote part of the systemic circulation. The blood becomes viscid; it cannot circulate through the lungs to receive oxygen, and the globules, the carriers of oxygen, are so damaged as to be unfitted for this function. Hence the lungs are found, after death, comparatively dry; the great venous trunks, the right auricle and ventricle, are gorged with blood, and the left cavities are empty and firmly contracted. This change in the fluidity of the blood induces a serious alteration of the red globules, most marked in the blood of the portal veins; they are irregular in outline, many of them are broken up, and the serum is crowded with *debris* and granular matter. I have frequently verified the observation that the tenacious matter found in the intestines, restores the arterial colour of the blood.

“The pleura, sac of pericardium, and peritoneum are coated with a gummy substance which adheres tenaciously to the hands, and so glues the pulmonary and costal pleura together, as to require, in some instances, no inconsiderable force to separate them, and must have increased the difficulty of respiration. This substance consists of cast-off epithelium and the lubricating serum deprived of much of its water.

“Early in the disease (death in a few hours after the first symptoms) the kidneys are found dry and bloodless, but this condition soon gives place to a deep congestion, when the pyramids and cortical substance become chocolate-coloured and microscopical vessels become visible to the naked eye. Subsequently the organs enlarge, the tubes of Ferrein and Bellini become crowded and choked with the cast-off epithelium and the Malpighian bodies are gorged with blood. These successive changes correspond with the different stages of Bright's disease,

and the rapidity with which they occur is one of the most remarkable phenomena in the clinical history of cholera.

"The cramps, the jerking respiration, and the præcordial anxiety, find a ready explanation in the condition of the intercranial circulation. The vessels of the base and of the hemispheres are much distended, and their finer ramifications brought into view. The sub-arachnoid spaces are filled with fluid, and the white substance presents on section, numerous bloody points. The particular change most deserving of attentive study, is the marked congestion of the medulla oblongata and pons Varolii. On one of the subjects examined, whose case had been particularly characterized by excessive cramps, and after death by a remarkable degree of *rigor mortis*, I perceived upon the right thigh a dried matter resembling semen. Carefully moistening it with distilled water I obtained a solution for microscopical examination, and ascertained that the dried matter was really semen. This is a striking fact, in confirmation of the view that the cramps are due to reflex action of which the medulla oblongata is the centre, or due to the congestion of this organ. This alteration in the circulation of the medulla oblongata and impairment of its nutrition, must affect the electrical relations of its molecules: hence the cramps. As the pneumogastric takes its origin from this centre, we have a satisfactory explanation of the jerking respiration and the præcordial anxiety.

"In the study of the pathological processes of cholera, we are at once arrested by the changes in the columnar epithelium of the intestinal canal, and the suppression of the renal secretion accompanied, or quickly followed, by extraordinary structural alterations. Which of these lesions is primary?

"If the cholera poison is contained in the rice-water matter, it probably acts locally upon the intestinal mucous surface, and all the other phenomena of the disease are secondary to the changes induced in the blood by the outward diffusion current. It becomes then a matter of prime importance to determine this point. Without designing it, I subjected myself to an experimental demonstration.

"*Experiment 1.*—A wound upon my left hand, bleeding freely at the time, was immersed in the various fluids of the body of a patient in the *post-mortem* examination. No result followed.

"*Expt. 2.*—A medium sized dog. Some fresh rice-water matter was injected subcutaneously, and a quantity was thrown into the rectum. Some local inflammation resulted from the injection, but no other effect was produced.

"*Expt. 3.*—Same as the preceding, except that considerable rice-water matter was also poured into the stomach. Same dog. He continued unaffected.

"*Expt. 4.*—Same dog. Some of the dried matter was made into a solution with water and a portion injected into the thigh, and the rest poured into the stomach. In fifteen minutes he had a free watery evacuation which was 'frothy,' but no other, and no subsequent symptom referable to the ingestion of cholera matter.

"As the gastric juice of the dog is powerfully acid, and his stomach digestion exceedingly active, it seemed desirable to bring the cholera matter into contact with some other mucous surface.

"*Expt. 5.*—Performed tracheotomy on the same dog, and injected some cholera matter into the trachea: also, threw some of the same matter into the nasal passages, and poured a quantity into the stomach. Recovered promptly from this rough treatment, ate food, but had no cholera symptoms.

"*Expt. 6.*—Same as the preceding, with the same result.

"The results of these experiments are, thus far, merely negative. They indicate, however, that the fresh rice-water matter, and the other fluids of the body in the recent state, are perfectly innocuous. The dried matter appeared to have more effect (*Experiment 4*). Our future experiments must be made with the rice-water discharges in a state of change, if anything may be accomplished in this way. The dejections are poisonous, if at all, under some as yet undetermined condition."

Iodide of Potassium in Erysipelas.—Dr. H. B. WITHERS, of Rantoul, Illinois, states (*Chicago Medical Journal*, October, 1866) that he has used the iodide of

potassium in about thirty cases of erysipelas with perfect success. He gives it in doses of ten grains every two hours, observing closely its effects, and so soon as the disease begins to subside he discontinues the medicine. It arrests the disease, he says, in from twelve to thirty-six hours. He employs no external application, but simply keeps the parts covered and moist.

Sulphite of Soda in Smallpox.—Dr. W. L. NICHOL states (*Nashville Journal of Medicine and Surgery*, August, 1866) that he has employed the sulphite of soda in smallpox with advantage. He gave it in solution, in the proportion of one drachm of the salt to six ounces of water. A tablespoonful of this was given every three hours.

White Pine Wood Bullet Probe.—Dr. V. GELISCH, of Los Angeles, Cal., recommends (*Pacific Med. and Surg. Journal*, Oct. 1866) a piece of white pine cut into the shape of a probe as a ready means of detecting a leaden ball in a wound. He says if such a probe be inserted into a wound and rubbed against the suspected object, and then quickly withdrawn, if the object be a leaden ball, traces of the lead will be plainly perceptible on the end of the probe. This will be useful where a Nélaton's probe is not at hand.

Hospital Gangrene.—Dr. MARTIN L. HERR, of Lancaster, Pa., gives (*Nashville Journal of Medicine and Surgery*, August, 1866) the following statistics of hospital gangrene occurring among the wounded at Hospital No. 1, in Nashville, during the campaign which ended in the capture of Atlanta:—

“For the six months ending November 30, 1864, the following number of cases occurred, and were treated with the following results:—

	No. of cases treated.	Cured by one application.	Cured by two applications.	Cured by three or more applications.	No. of deaths.	Average number of days under treatment.
Bromine . . .	161	112	27	14	8	6.6
Nitric acid . . .	15	5	3	3	4	7.5
Sol. chlor. zinc . . .	15	11	2	2	2	4.8
Spts. turpentine . . .	3	...	...	3	...	6.
Potassium permanganate of potassa	4	Failed--cured by bromine.			...	...
Tinct. iodine . . .	2	...	1	1	...	7.5
Liq. sod. chlor. . .	2	...	...	2	...	4.5
Total . . .	202	...	...	...	...	...

“It will be seen that the majority of cases were treated with bromine, and most of them arrested by one application alone. The gangrene was considered cured when the wound presented a healthy granulating surface. Sol. chlor. zinc stands next on the list of the most successful agents. * * *

“During this same time, about three hundred cases were treated at the Cumberland Hospital with nitric acid; about fifty out of this number died, and many lost their limbs, showing that the nitric acid did about as much mischief as the gangrene. Nitric acid as a remedial agent in this disease, should not be used while we have remedies so much better, and which can be applied with so much less danger of destruction to the healthy tissues.”

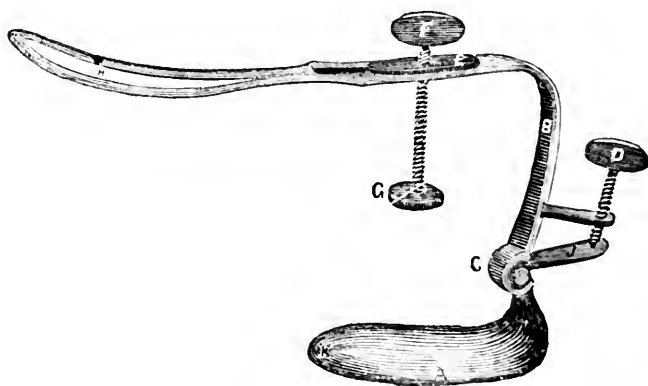
Fractured Patella successfully treated by the Application of an Iron Ring.—Dr. W. A. GIBSON reports (*St. Louis Med. and Surg. Journ.*, Oct. 1866) a case of transverse fracture of the patella thus treated. He took a measurement of the sound patella, and had a ring made of iron (allowing for padding), which he padded well with cotton wadding, cut in strips and wrapped around the ring, over which he applied a bandage. To each side of the ring he sewed strips of bandage. He then placed a well-padded splint twenty-four inches long to the posterior aspect of the leg and thigh, which was secured by a few turns of bandage

at the lower and upper ends, the bandage being loose so as not to interfere with the circulation. He next brought the two fragments of bone into apposition, and placed the ring around the patella, and tied the strips of bandage over the splint, thus securely holding the ring in its place, and keeping the broken bone always in complete apposition, thereby giving the greatest possible chance for a bony union. At the expiration of thirty days, he removed the ring, and commenced passive motion of the limb, and found the union to be bony and complete, and to-day (June 15th) he has very good use of the limb.

"The appliance," he says, "did not give the patient the least pain, and there was no interruption of the circulation by the bandages. It was impossible in this case for the patella to escape from the ring, but possibly in some cases, as of women, when there is a good deal of adipose tissue, and but little prominence of the patella, it may not be so easy to apply the ring; but I am persuaded that it will give entire satisfaction in all cases. I claim by the application of the ring to have reduced one of the ugliest fractures of the human frame to one of the simplest for treatment."

Self-retaining Speculum.—Dr. GEO. SYNG BRYANT describes (*St. Louis Med. and Surg. Journ.*, Oct. 1866) a modification of Sims' Speculum which seems useful, being self-retaining.

"This instrument consists of a blade *A* and lever *B*, with screws attached, so as to completely fit the lever to the sacrum and back, and to elevate or depress the blade at will.



"This speculum operates precisely in the same manner that the Sims' Speculum does, with the exception that it retains itself. The blade *A* is introduced into the vagina, and then connected with the lever *B* by the notched joint *C*. At the end of the fenestra *H* in the lever, a strap is attached which is to be carried around the body or waist, and tied before the pad, upon which the button *G* rests, is to be placed upon the sacrum. Above the bend of the lever is a slide *E*, to which is attached a screw with a button *F* at the end. This button rests upon the pad on the sacrum, and the screw is then turned until the requisite amount of tension is made upon the perineum.

"The screw *D*, at the lower end of the lever, which rests upon the arm *I*, of the blade, is now turned until the free or distal end of the blade *K*, is elevated or depressed, as may be desired, to the proper degree to bring into view the os uteri and the whole of the vagina, except that portion upon which the back part of the blade rests. This speculum is easily fitted, and its introduction is without pain to the patient. It was made by Leslie & Co., of this city, from a diagram. The accompanying cut is only one-third the size of the instrument."

Dr. B. states that when he contrived this Speculum, he was not aware that Dr. Emmet, of New York, had previously modified Dr. Sims' speculum so as to make it self-retaining, but, though Dr. E.'s modification, he states, answers well in lean women, with a thin, weak perineum, it does not do so well in muscular women.

Successful Removal of a Large Bronchocele.—Dr. WM. WARREN GREENE records (*Medical Record*, Dec. 1, 1866) a case of this. The patient was a female 45 years of age, with an enlargement of the right lobe of the thyroid gland, which first appeared twenty-six years before, but had not given her any trouble until within the last eighteen months, during which time it had rapidly increased to its present size. "Its dimensions were now such that the common carotid was crowded behind the posterior edge of the sterno-mastoid muscle, where its pulsations were distinctly felt, and the trachea was pressed firmly to the left side. So great was the pressure upon these organs and the œsophagus that any attempt to swallow or talk gave her terrible spasms of dyspnœa. She was unable to lie down, and required constant watching during her broken sleep, lest she should die of suffocation. She suffered very much from headache and giddiness, and could not stoop without losing her consciousness. All these symptoms had been for two months rapidly increasing in intensity, and for two weeks almost a daily aggravation had been noticeable." * * *

"The patient was already aware of her imminent danger, and her only question was as to the *possibility* of relief. I told her in all probability the removal of the growth would be found impracticable; and that even if she survived the operation, which was not likely, the chances were a hundred to one that she would die of secondary affections; but still there was a bare possibility of success, and that while I would by no means advise an operation, yet if she, being fully aware of all the facts, insisted upon taking this desperate chance, I would undertake the removal of the tumour. I was happy to have my own views as to the propriety of this advice indorsed by Dr. Storer. She immediately decided upon its being done, and at once. Accordingly, in the presence and with the assistance of Prof. H. R. Storer, Dr. F. K. Paddock, and several students, I made the operation in the following manner: The patient, being etherized, was placed in the ordinary position for ligation of the carotid, and a single straight incision was made over the tumour, extending from the inferior maxilla to the clavicle. The anterior external jugular vein, which ran close by the line of the incision, was not injured. The sterno-mastoid, which was spread over the mass like a thin ribbon, and the several fasciæ, were successively divided upon a grooved director, and the areolar tissue with the knife and fingers, the handle of the scalpel being employed much more freely than the blade. On raising upon the director the little thin layer of fascia immediately investing the tumour, several veins were wounded and bled profusely; this was controlled by the fingers of an assistant, and the delicate envelope carefully reflected from the gland; but although this was done with the utmost caution and gentleness, several other veins were ruptured. I now found that the entire growth was completely covered with a network of these vessels; and so thin and tender were their walls that the forceps tore and the ligature cut their coats; and now, although the blade of the knife had not touched the surface of the tumour, so many of these veins were opened that, in spite of all the pressure that could be made, the hemorrhage was fearful. I now rapidly separated the areolar attachments, and in a few seconds was at the pedicle, which I found containing three large arteries, whose pulsations were very distinct, and which were my guides for dividing the pedicle into three parts, which I also accomplished with the fingers. I immediately tied each third with a ligature composed of eighteen strands of saddler's silk, *saturated* with wax and *loosely twisted*. As I drew the last cord all hemorrhage instantly ceased. The pedicle was carefully divided close to the goitre, and it removed. During the dissection, I found at one point the tumour quite firmly adherent to the sheath of the vessels; and, while separating it, a gush of venous blood indicated the rupture of a large vessel. The finger of an assistant controlled it until the ablation of the bronchocele, when examination proved the internal jugular to be wounded. This was tied with a ligature of three strands of silk loosely twisted; no other vessels needed interference. The entire operation occupied twenty-two minutes.

"After carefully sponging the wound and allowing the surface to glaze somewhat, the edges were united by interrupted sutures, water-dressing applied, and she placed in bed. The extremities were cool, and pulse feeble but regular, and less than ninety per minute. She reacted nicely, and passed a more comfortable

night than she had for weeks. The after-treatment consisted in perfect quiet, water-dressings when agreeable, anodynes *pro re nata*; the exhibition of muriated tincture of iron, twenty drops every four hours, and as much rich broth, gruel, and milk as she would take at regular intervals. For several days there was considerable irritation of the œsophagus and trachea, but not enough to interfere seriously with deglutition or respiration. This passed away, and she recovered without a bad symptom. The last ligature came away on the twenty-sixth day; in another week the wound was entirely healed, and she is now in perfect health and restored to a happy family."

[Dr. Greene must be congratulated on the fortunate termination of this case.]

Ovariectomy.—Dr. J. F. MINER reports, in the No. of the *Buffalo Medical and Surgical Journal* for June last, a case of successful removal of a multilocular ovarian tumour, weighing twenty pounds; the pedicle has returned into the abdominal cavity, the ligatures being applied to the vessels separately and cut closely; and in the September No. of the same journal he records a case of multilocular ovarian tumour weighing nineteen and a half pounds with fatal results. The subject of the second case was 32 years of age, who had enjoyed good health until two years previously, when a tumour was discovered in the right side which had since steadily enlarged. The patient being fully anesthetized, "an incision was made about three inches in extent down upon the tumour; very little fluid was contained in abdominal cavity outside the cysts. The hand was carefully introduced and the tumour found attached throughout its whole anterior surface to the peritoneum, by apparently recent attachments which were readily and easily broken. Trocar and canula was now introduced with the view to lessen the tumour and allow its extirpation through as small an opening as possible, in the abdominal walls. A large ovarian trocar was introduced and through the canula, after considerable time, oozed the thick, yellow, soap-like fluid, which comprised the contents of the two principal sacs opened. By this means the tumour was reduced to a mass weighing about five pounds, and elevated from its bed through an incision not over three inches in extent; care was taken that neither blood or the contents of the cysts should flow into the abdominal cavity. The pedicle was found small, and was ligated by a single silk cord and the extremities were then passed through the vaginal septum, as proposed in a report of a successful case, published in the July No., where the vessels of the cord were tied separately and the ligatures cut closely. * * * *

"The pedicle was returned after its ligation, and division with the cæreseur into the abdominal cavity, and the wound brought together with silver sutures introduced deeply, so as to inclose the edges of the peritoneum; water dressings, compress and bandage applied, and one-half grain morphia given subcutaneously.

"The patient soon roused from the influence of the ether and appeared as well as if no operation had been made."

The patient died fourteen days after the operation of diffused inflammation of the peritoneum.

Gunshot Wound of the Bladder.—Dr. JAS. S. ATIXON relates (*Cincinnati Journal of Medicine*, March, 1866) a very remarkable case of this, in a boy nine years of age, who, while in a stooping position, was shot by a pistol, the ball from which entered along the posterior margin of the tuberosity of the right ischium, and passed into the bladder near its fundus, coming out an inch and a half or two inches above the pubes, immediately in the linea alba.

The shock of the injury almost instantly prostrated the little fellow, and he was given up as lost. The urine at once escaped, mixed with blood, from both orifices, and the feces passed away involuntarily; however this complication seemed to be the result of the first effects of the injury, but the discharges from the bladder imparted a distinct stercoraceous odour, though not sufficiently to prove that the wound had any direct communication with the rectum.

A physician was called, who, after examination, pronounced the wound necessarily mortal, but gave something to ease pain. "An Eclectic physician was now

called, who plunged the largest sized silver catheter into the urethra, and with vigorous efforts succeeded in thrusting the instrument, not into the bladder, but into the membranous portion of the urethra, when the screams and contortions of the patient were so piteous that he was compelled to abandon the operation. The doctor thereupon decided the patient's case beyond the skill of the profession, though he continued several days, like his predecessor, to visit the patient; when the parents succeeded in procuring one of the regular faculty, who made an examination of the wound, and then, as he told me himself, declared the patient '*in articulo mortis.*' On the tenth day from the injury I was called in to see him, and found both orifices discharging urine and pus freely, attended with an intolerable fetor. Up to this time no urine had passed through the urethra. The patient was pale and shrunken, the pulse feeble and too quick to be correctly counted. The lower extremities were drawn up and bent upon themselves, with the right knee fixed against the opposite thigh, just about the lower third. The pain and tenderness in the pelvic region and along the course of the right limb, were so intense, that even the weight of the sheet, unless carefully adjusted, produced screaming and exhaustion. The feces were evacuated in the bed, and removed as best they could by means of cloths and water, thus adding to the already wretched condition of the patient by the excoriating effects of the dejections coming in contact with the nates and lower limbs. The tongue was coated with a heavy yellow fur, which was inclined to dryness. It occurred to me that if there were any chances for my patient's recovery, they must be sought for through an active, persevering and rational treatment; and although my first attention should have been directed to the immediate opening of the urethra, the weakened or depressed circulation, together with the very extensive chylipoietic derangement, and moreover, the extreme sensitiveness of the penis and appendages demanded a different course. I therefore evacuated the bowels with castor oil, and administered one grain of quinine in conjunction with one of hyoscyamus every two hours, until the patient was brought under the influence of the latter article, which was indicated by abatement of pain and a disposition to sleep. I found on the third day that this treatment had procured ease and slight tolerance of motion of the right knee. The discharge of pus and urine continued as profuse as ever from the wounds. There was no appearance of urine from the urethra, though the sensibility of this opening was decidedly less." It seemed to Dr. A. at this juncture that it was now desirable to direct, if possible, the urine and pus through the natural channel. In order to do this, he administered chloroform, and then introduced the smallest size catheter, "which met with no obstruction until it came into the vicinity of the membranous portion of the urethra, where the Eclectic had by his ignorance and bungling, caused so much mischief eight or ten days before, when the instrument could not be introduced further without making the case worse; it was in consequence withdrawn, and the quinine and hyoscyamus continued, with the addition of a hop poultice applied over the hypogastric and pubic regions." A nutritious diet was ordered. "The catheter was introduced every other day for a month, and every time the instrument was forced further, until it was finally made to enter the bladder without causing much pain, though every time it was introduced the chloroform had to be used. The frequent introduction of the catheter had blunted the sensibilities as well as enlarged the urethra. The urine and pus now began to escape from this orifice, which, notwithstanding the injury received in its membranous section, retained the fluid in the bladder until voided by the voluntary act of the patient. The quinine was now suspended, and the ext. hyoscyamus in grain doses, repeated three or four times a day, with the addition of a teaspoonful of the fluid extract of buchu at bedtime. The soreness in the region of the pelvis soon began to subside; the discharges from the wounds gradually diminished in quantity, and in the course of a month, the orifice in front closed up. The opening in the right nates continued to discharge urine and pus for nearly two months, but in comparatively small quantities. In proportion as the pus diminished, the opening on the hip assumed a healthy appearance, and when it ceased to pass, though it was somewhat mixed with the urine that was voided through the urethra, the wound closed up and became sound. At this writing the patient is enjoying his usual health."

NECROLOGY.—Died, on the 15th October, 1866, ROBERT W. GIBBS, M. D., of Columbia, South Carolina, æt. fifty-seven years.

The medical profession has ever been foremost in the cultivation of the sciences generally, and in the advancement of the varied steps of social progress and improvement, and in our own day none of its members have done more to sustain its reputation in these respects than the subject of the present notice.

Born in Charleston in 1809, and educated academically in the University of South Carolina, he received his medical degree in his native city in 1830, soon afterwards entering into the practice of his profession in Columbia, where he has just ended a life of extraordinary activity, distinction, and usefulness. For a long course of years he filled a large sphere, enjoying the support and confidence of one of the most enlightened and refined communities in our country; among whom he will ever be remembered as the chosen friend, adviser, and consolator of more than one generation.

His best eulogy will be found in a recital of the several positions occupied by him, and the work which he accomplished. Deeply imbued with the classic sentiment *Nihil hominum michi alienum puto*, he entered with zealous ardour into all pursuits which tend to promote the general welfare. His early exhibition of talent and energy met with prompt appreciation. Immediately on leaving college he was appointed assistant to Dr. Thos. Cooper, professor of chemistry, geology, and mineralogy, and, on his death, became his successor in that chair. After his resignation of it, he continued the prosecution of his researches in geology and palæontology. His collection of fossils became a very extensive and valuable one; especially rich in specimens of the squalidæ, his monogram concerning which deservedly obtained for him high reputation.

In the midst of extensive professional employments he found time to teach and give lectures on medicine in conjunction with the distinguished Professor Josiah C. Nott, now of Mobile, and to prepare numerous papers for the Journals, displaying a rare versatility of powers, and an uncommon extent of reading and observation. We may point out as proof his "Mémor of the Fossil Genus *Basilosaurus*;" his monograph on fossil squalidæ already referred to; his Lecture on "The Present Earth the Remains of a Former World;" and his contributions to the Southern Quarterly Review of articles on Palæontology; Ornithology; Animal Magnetism; Artesian Wells; Microscopical Examination of the Hair of the different Races; Railroads; Banks; The South Carolina College, of which he was for many years one of the trustees; Malaria; Early History of the Judiciary in South Carolina; Historical Discoveries on the Oregon Boundary. He also published three volumes of "Historical Documents of South Carolina," and a memoir of the lamented young painter Deveau; meanwhile filling twice, by popular election, the office of Mayor of the city, and editing, with great spirit and success, a daily newspaper.

He was a devoted lover of the fine arts, and a munificent patron of artists; and his residence was the seat of a wide and generous hospitality. His fine collection of pictures and statuary, his library and museum are now dust and ashes, consumed with his home in the destruction of Columbia in 1865. His last days, therefore, were days of privation and suffering. Throughout the disastrous war, which terminated in that year of ruin, he had served his native State as surgeon-in-chief; winning for himself, in that position, the esteem and affection of friends and enemies alike, for his skill, humanity, and administrative ability.

He was for several years president of the Medical Association of South Carolina, and had been made a Fellow of many scientific and literary societies at home and abroad; among them the "Academy of Natural Sciences," the "Numismatic and Antiquarian Society," and the "Historical Society of Pennsylvania;" the "Oriental Society of New York;" the "National Institute," Washington; and the "Royal Society of Northern Antiquities," Copenhagen.

Shadows—naught else, we are;

And shadows all that, darkling, we pursue;

Our sun of hope, alas! a falling star;

Our lives, the morning dew.

S. H. D.

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TO READERS AND CORRESPONDENTS.

IN addition to the communications already acknowledged, and which have not yet been published, we have received papers from Drs. J. H. Brinton, J. C. Nott, E. Holden, T. Parvin, J. Green, W. S. W. Ruschenberger, S. Hubbard, J. G. Harvey, J. H. Shaffner, W. W. Lambuth, D. N. Rankin, S. G. Weller, S. J. Weldon, J. K. France, W. F. Atlee, Clarkson Freeman, John Parsons, T. H. Buckler, Carl Both, R. A. Kinloch, and M. Kempf, all of which shall receive a respectful consideration when articles are selected for the July number.

All articles intended for the *Original Department* of this Journal must be communicated to it exclusively.

Contributors who design to favour us with original articles for the July No. should forward them before the 1st of May.

Compensation is allowed for original articles, and reviews, *except* when illustrations or extra copies are desired. A *limited* number of extra copies will be furnished to authors *if the request for them be made when the communication is sent*. The extensive circulation of this Journal renders extra copies of comparatively little value to authors who only desire their observations made known to their professional brethren.

The following works have been received:—

Medico-Chirurgical Transactions. Published by the Royal Medical and Chirurgical Society of London. Volume the 49th. London: Longmans, Green, & Co., 1866.

Transactions of the Obstetrical Society of London. Vol. VIII. for the year 1866, with a List of Officers, Fellows, etc. London: Longmans, Green & Co., 1867.

Catalogue and Report of Obstetrical and other Instruments exhibited at the conversonatione of the Obstetrical Society of London, held by permission, at the Royal College of Physicians, March 28, 1866, with numerous illustrations. London: 1867.

St. George's Hospital Reports. Edited by JOHN W. OGLE, M. D., F. R. C. P., and TIMOTHY HOLMES, F. R. C. S. Vol. 1, 1866. London: John Churchill & Sons.

The Indigestions or Diseases of the Digestive Organs functionally treated. By THOMAS KING CHAMBERS, Honorary Physician to H. R. H., the Prince of Wales, consulting Physician and Lecturer on the Practice of Medicine at St. Mary's Hospital, etc. London: John Churchill & Sons, 1867. (From the Author.)

On Malformations of the Human Heart, etc., with original cases and illustrations. By THOMAS B. PEACOCK, M. D., F. R. C. P., Physician to St. Thomas's Hospital, etc. London: John Churchill & Sons, 1866.

On Ovariectomy (Clinical Surgery, Part VII.). By THOMAS BRYANT, F. R. C. S., Assistant Surgeon to Guy's Hospital. London: John Churchill & Sons, 1867.

Change of Air considered with regard to Atmospheric pressure, and its electric and magnetic concomitants, in the treatment of Consumption and Chronic Disease, with a general commentary on the most eligible localities for invalids. By J. C. ATKINSON, M. D. London: Trübner & Co., 1867.

Atlas of Surgical and Topographical Anatomy. By B. J. BÉRAUD, Surgeon and Professor to the Maternity Hospital of Paris, etc. etc. Illustrated by One Hundred Plates, drawn from Nature. By M. BION. Translated by ROBERT THOMAS HULME, M. R. C. S., Eng. Parts, 4, 5, 6, 7. London: H. Baillière, 1866.

Remarks on Chronic Albuminuria, originating during the convalescence from Scarlet Fever and other eruptive diseases. By HERMANN WEBER, M. D., F. R. C. P., Physician to the German Hospital. London, 1866.

Syphilitic Disease in the Liver, Lungs, Bronchial Glands, Dura Mater, and Cranium, By HERMANN WEBER, M. D., etc. etc. London, 1866.

A Modification of the Operation for Strabismus. By RICHARD LIEBREICH, M. D., Professor of Ophthalmology, Paris. (From the Author.)

Erkennung und Behandlung der Prostata-Krankheiten. Von HENRY THOMPSON, Arzt am Londoner Universitäts-Hospitale, etc. Autorisirte deutsche Ausgabe, mit 25 in den Text gedruckten Holzschnitten und 2 Farbendrucktafeln. Erlangen: Verlag von Ferdinand Enke, 1867.

Das Vorkommen der Blattern in dem Herzogthum Nassau in den Jahren 1818 bis 1862. Nach den Akten bearbeitet von DR. ARNOLD VON FRANQUE, Privatdozent an der Universität München. Wiesbaden, 1866.

The Indigestions; or Diseases of the Digestive Organs functionally treated. By THOMAS KING CHAMBERS, Honorary Physician to H. R. H., the Prince of Wales, etc. etc. Philadelphia: Henry C. Lea, 1867.

The Half Yearly Abstract of the Medical Sciences. Vol. XLIV. July—December, 1866. Philadelphia: Henry C. Lea, 1867.

The Renewal of Life. Lectures, chiefly Clinical. By THOMAS KING CHAMBERS, M. D., Honorary Physician to H. R. H. the Prince of Wales. Second American, from the 4th London Edition. Philadelphia: Lindsay & Blakiston, 1866.

The Functions and Disorders of the Reproductive Organs in Childhood, Youth, Adult Age, and Advanced Life, considered in their Physiological, Social, and Moral Relations. By WILLIAM ACTON, M. R. C. S., etc. etc. Second American from the 4th London Edition. Philadelphia: Lindsay & Blakiston, 1867.

Guide for using Medical Batteries. By ALFRED C. GARRATT, M. D. Fellow of the Mass. Med. Soc., etc. Philadelphia: Lindsay & Blakiston, 1867.

The Science and Practice of Medicine. By WILLIAM AITKEN, M. D., Edin., Prof. Pathology in Army Medical School, etc. In two volumes. Vol. II., from the 4th London Edition, with additions. By MEREDITH CLYMER, M. D., late Prof. of the Inst. and Pract. Med. in Univ. New York, etc. Philadelphia: Lindsay & Blakiston, 1866.

On the Action of Medicines in the System. By FREDERICK WILLIAM HEADLAND, M. D., B. A., F. L. S., F. R. C. P., etc. etc. Fifth American from the 4th London Edition, Revised and enlarged. Philadelphia: Lindsay & Blakiston, 1867.

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ART. I.—*Observations on Wounds of the Internal Jugular Vein and their Treatment, with Special Reference to the Safety of the Ligature; embracing a Statistical Account of Eighty-Six Cases, with some Remarks upon the General Applicability of Ligation as a Venous Hemostatic Agent.* By S. W. GROSS, M. D., late Surgeon and Brevet Lt.-Col. U. S. V.

IN the January number of this Journal the consideration of wounds of the internal jugular vein was brought to a close by a brief examination of the cases of simultaneous injury of that vessel and the carotid artery, resulting in the formation of arterio-venous aneurism. There is, however, one example of aneurismal varix, which occurred in the practice of M. Joret, of Vannes, in 1835, which deserves special mention, as it presents the very interesting peculiarity of a pistol-ball becoming encysted in the vein.

A man, 35 years of age, was wounded in a duel on the 2d of May, 1835, the missile, a small pistol-ball, having traversed the right side of the face and entered the neck behind the left tonsil, where it could be readily detected, but resisted all efforts at extraction by the mouth. Four days subsequently the wound had suppurated, and the ball had disappeared. A pulsating tumour soon formed, but the characteristic vibratory thrill did not appear until October of the following year. During the same winter the patient presented symptoms of softening of the brain; he became idiotic and paralyzed; and from June, 1837, until the date of his death, he had several epileptic convulsions. An attack of acute bronchitis put an end to his sufferings on the 25th of October, 1837, nearly two years and a half having elapsed since the reception of the injury.

The *post-mortem* examination showed the brain to be extensively softened, with thrombi in each lateral sinus. The internal jugular vein was found to contain the somewhat flattened ball, just behind the angle of the jaw. It was adherent to the sides of the vessel, and was retained in its position by tissues of new formation. The coats of the vein below the ball were perfectly normal in size and structure. Above, or between the missile and the base of the skull, the vein had become so much thickened as to resemble an artery, and it here

communicated with the internal carotid artery, which was expanded into a sac as large as a pigeon's egg, extending from the point of communication with the vein to the carotid foramen. This pouch contained clots of old and new formation, and below it, the artery was of its natural shape and dimensions.¹

TREATMENT OF WOUNDS OF THE INTERNAL JUGULAR VEIN.—The object of the treatment of wounds of the internal jugular vein being to restrain hemorrhage and to prevent the introduction of air, it will be found that the only measures upon which reliance can be placed are ligation and compression. *Deep inspirations*, as advised by Dupuytren as a means of arresting venous hemorrhage, are entirely out of the question, on account of the danger of air being at the same time drawn into the vessel; and even were this not the case, the measure is inapplicable, from the fact of operations being conducted under the influence of anæsthetic agents.

Styptics.—The ancients placed great reliance on incarnative or styptic remedies, combined with compression, and of these, twelve centuries ago, Paulus Ægineta writes:—

"The most excellent of all the incarnative medicines which we know, is that used with safety for hemorrhages from the meninges of the brain, and which may be used in wounds of the neck, even for those of the jugular veins, for it will restrain a bleeding from them without a ligature. It contains of the fattest frankincense, p. j; and of aloes, when applied to soft bodies, p. ss; but when too hard, an equal quantity, and instead of the frankincense mauna is to be substituted. These are to be mixed with the white of an egg until they become of the consistence of honey, when it is to be applied upon the soft down of a hare to the vessel and the whole wound; and a bandage is to be put on externally, the first four or five turns of which we are to make upon the bleeding vessel, and from thence extend to the root of it."²

In the first half of the last century Wiseman and Turner saturated their compresses with a styptic composed of astringent powders rubbed up with the white of an egg and vinegar. Richter, towards the close of the last century, dispensed with styptics, and advised pressure for small wounds of the internal jugular. "This is accomplished by means of graduated compresses, underneath which a small piece of sponge is placed, retained by a roller. Should the latter prove troublesome, digital compression may be substituted, and be continued for one or two days."³

Styptics, in conjunction with compression, may not only be dispensed with, but their employment is useless. The solution of the sesquichloride of iron, which is most commonly employed, is to be scrupulously avoided, as it has an escharotic action on the coats of the vessel, and it is very liable to excite suppurative inflammation. It will moreover produce a very extensive coagulum, which may become disintegrated, and thus lead to purulent infection.

Acupressure is inapplicable.

¹ Encyclographie des Sciences Médicales, vol. ii., 4th ser., p. 578. 1840.

² The Seven Books of Paulus Ægineta, translated by Francis Adams, vol. ii. p. 128. Sydenham Society. London, 1846.

³ Anfangsgründe der Wundarzneikunst, vol. iv. p. 173. Gottingen, 1797.

I. COMPRESSION.—Direct compression is the means usually advised by surgical writers to arrest bleeding from this vein. Mr. Pirogoff states that it has succeeded with him in every case, the number of which he does not, however, record;¹ but its adoption does not appear to have been so general as that of the ligature. Direct compression may be made by the fingers, or by plugging, in both of which it is said to be immediate, or by compresses placed over the closed wound, when it is mediate. The latter plan is to be preferred, and will answer an excellent purpose for small wounds.

Digital compression is valuable as a temporary means, in the event of the vein being opened during the performance of an operation. The finger is at once to be applied to the bleeding orifice, and retained until some time after the completion of the operation, to favour the formation of a coagulum; should the vein be completely divided, both extremities will require pressure, the cardiac end first, to prevent the entrance of air, and then the distal end to stop bleeding. As a permanent measure, the finger has been successfully resorted to in two cases—IV. V. In the former forty-eight hours sufficed to complete the cure; in the latter, seventy-two hours, but on account of its great inconveniences, permanent digital compression is not to be recommended.

Plugging was adopted in six of the successful and in both of the fatal cases; in four cases sponge, and in four charpie and lint, were the materials employed. The objections to charpie are that after its meshes have become saturated with blood, some of that fluid will escape from the external wound; and that it is liable, by the movements of the neck, as in deglutition, to be rolled into a smooth mass or ball, and become detached from the bleeding point. Sponge will, therefore, prove the very best material for tamponing. A small piece is to be retained in contact with the orifice until it adheres, when the cavity is to be filled with the same material, the external wound is to be lightly approximated by adhesive strips, and over the whole a compress is to be applied. In general, however, the latter will not be required at all, as the first piece of sponge will adhere so closely that further pressure may be dispensed with. The sponge is to be removed at the expiration of sixty hours, or three days, as was done in the case of Professor Langenbeck, at which time we may expect the wound of the vein to have become closed, or blocked up by coagulum.

Mediate compression is the most unobjectionable of all the modes of compression. The edges of the external wound having been approximated by a few points of the interrupted suture, successive layers of old linen are to be piled upon it and retained by a roller, or, better still, by adhesive strips. If the opening in the vein be small and does not gap, a moderate degree of pressure only must be exercised, in order to afford a light support to the walls of the vessel, and avoid obliteration of its cavity.

¹ Grundzüge der Allgemeinen Kriegschirurgie, p. 555. Leipzig, 1864.

The subjoined fourteen cases, all that I have been able to collect, are instances of cures by the three modes of compression:—

Ambrose Paré has narrated three cases of punctured wounds of the jugular vein, in which the lesion must have been small, as he distinctly states that large wounds are mortal from hemorrhage. He does not, however, mention which jugular was involved, except in the second case—"les rameaux de la veine et artère jugulaire"—which certainly points to the internal jugular, particularly as the recurrent laryngeal nerve was wounded. From the direction of the wounds in the first and third cases, the anterior or internal jugular was punctured, probably the latter, as the bleeding was very copious. The cases are somewhat abbreviated, but literally translated, and are well worth reproduction. To use Paré's own language, "*Or en cest endroit je vœux bien reciter ces trois histoires, à fin qu'elles servent d'instruction signalée pour le jeune Chirurgien, si telles playes luy tombent entre ses mains.*"

CASE I.—On the 1st of May, 1574, Francis Brege, a pastry-cook, was wounded in the throat by a sword, which cut a part of the tracheal artery, and one of the jugular veins, from which flowed a great quantity of blood and a whistling from the said tracheal artery. The wound was stitched, and astringent remedies applied, and shortly after the air which escaped from the wound intruded itself between the areolar tissue and muscular spaces, not only of the throat, but also of the whole body (like a sheep which has been inflated to skin it) preventing speech. The face was so swollen that there was no appearance of nose nor eyes. A consultation was held; M. Bugo thought the patient could not recover; but Master John, the younger, did not wish to leave him without doing something, and being a bold operator, made several deep incisions, by which the blood and air were evacuated. Finally the pastry-cook recovered his speech, and some time afterwards was completely cured by the grace of God. He is still living, and pursuing his occupation with the Duke of Guise.

CASE II.—A nobleman, twenty-five years of age, received a sword wound of the throat, near the tracheal artery, which cut the branches of the jugular vein and artery, followed by a very large flow of blood, which was stanchèd after great trouble. Moreover, one of the vocal nerves was cut; likewise the nerves which arise from the vertebrae of the neck and are distributed to the arm, on which account the arm was motionless and paralyzed. Moreover, speech was greatly impaired, and the neck became a little twisted, so that he could not turn it as formerly. He was taken to the house of Master Pierre Petotot, Master Barber-Surgeon, with whom I consulted. I greatly doubted his recovery, and for this reason I sent for MM. Cointeret and Pietre, men well versed in surgery, and we reported to the courts that the wound was mortal. I continued of the same opinion, and God cured him. The arm remained powerless and the speech impaired.

CASE III.—In the year 1550, a man was wounded by a sword thrust in the throat, which cut one of the jugular veins and the tracheal artery. There was a profuse loss of blood, and he could not articulate until the wound was stitched and dressed. On account of the very large amount of blood lost, my prognosis was early death. However, I can assure you that he escaped, a result which I believe is to be more attributed to the grace of God than to mortal means and medicines.¹

¹ Œuvres complètes d'Ambrose Paré. Par J. F. Malgaigne, vol. ii. p. 91-93. Paris, 1840.

There can be no doubt that these cases come properly under the head of cures by compression, for Paré remarks : "Et si la playe est avec incision des veines jugulaires et arteres carotides, l'effusion de sang serra arrestée, comme nous avons décrit au chapitre du flux de sang." On referring to that chapter¹ it will be seen that Paré advises the application of styptics and compression, and if these fail, they are to be removed, and pressure with the finger on the orifice of the vessel is to be substituted until a clot has formed.

CASE IV.—"Compression indeed of itself, without any restraining at all, has stopped the most violent of these fluxes, at least for a time; a remarkable instance of which we have given us in the case of his excellency William Prince of Orange, who, in his hurt by the Spanish boy, as my Lord Bacon relates, where the internal jugular was opened, could find no way to stop the flow of blood, till the orifice of the wound was hard compressed by men's thumbs, succeeding, for their ease, one after the other, for the space of forty-eight hours, when it was hereby stanch'd; though Heurnius delivers the same (I suppose, bursting out again), to be suppressed, after all others tried unsuccessfully, by means of a tent armed with a digestive, and wrapt round in colcothar, or the powder of burnt vitriol."²

CASE V.—"Chalmetée reports a case in which the internal jugular vein had been wounded, and the person was cured in three days by digital compression."³

CASE VI.—Wiseman narrates the case of a gentleman who had the internal jugular pierced by a rapier. The wound was small, but it bled with a full stream. "A servant stopped it with his fingers, whilst I made dressings ready of our common astringent powders, with the white of an egg and a little acetum, spread upon a pledget of lint, and a composition of the same, with compress and such bandage as it would bear. The hemorrhage recurred several times, but the cure was complete on the twentieth day."⁴

CASE VII.—"Professor Hamilton, of Geneva College, New York, who was unfortunate enough to cut the internal jugular vein in an operation upon the neck, thrust a sponge into the wound, and allowed it to remain until suppuration removed it. The frightful hemorrhage was thus stayed, and the patient recovered"⁵

CASE VIII.—Professor Henry Miller met with a case of division of the internal jugular vein in an attempt at suicide. The loss of blood was most profuse, but as it had ceased from syncope, Dr. Rogers, who first saw the woman, merely stitched the wound of the neck, and applied compresses over the divided vessel. On the eleventh day secondary venous hemorrhage occurred with the estimated loss of one gallon of blood; and there was a considerable cavity over the vessels, filled with blood, partly fluid and partly coagulated. Compresses were again trusted to. On the sixteenth day there was an alarming repetition of the hemorrhage, but this time from the carotid artery, on which one ligature was applied below the ulcerated point of the vessel. The wound healed rapidly; there was no return of the bleeding, and the patient made a good recovery.⁶

¹ Œuvres complètes d'Ambrose Paré. Par J. F. Malgaigne, vol. i. p. 440.

² The Art of Surgery. By Daniel Turner, M. D. 6th ed., vol. i. p. 346. London, 1741.

³ Enchiridion de Chirurgie, ch. 19; and Jobert, Traité de Chirurgie d'Armée, 1863, p. 428.

⁴ Eight Chirurgical Treatises. 5th ed., vol. ii. p. 66. London, 1719.

⁵ Cooper's Surg. Dict. Reese's Am. ed., Supplement. p. 166. New York, 1842.

⁶ Western Med. and Phys. Journ., vol. i. p. 425, Nov. 1827.

CASE IX.—M. Roux, in an operation upon the neck, opened the internal jugular. The wound was plugged and the patient recovered.¹

CASE X.—Professor Langenbeck wounded the internal jugular in the removal of a cyst of the neck, to which the sheath of the vessels was intimately connected. The wound was filled with charpie, and its edges were drawn together by adhesive strips. A compress was placed upon the wound, and retained in position by a towel. On the third day the parts were dressed and the compress and charpie dispensed with; and on the thirteenth day the wound had cicatrized. A portion of the vein four lines long and two lines in breadth had been sliced away.⁴

CASE XI.—M. Bégis reports the removal of a cancerous tumour of the neck, during which the internal jugular vein was wounded and air was aspirated. The orifice was immediately compressed by the finger and the operation finished. At its completion methodical compression, in the usual manner, was substituted, and the patient recovered without a bad symptom.²

CASE XII.—M. Velpeau reports a case similar to that of M. Bégis in which the hemorrhage was successfully repressed by compression deep in the wound. Air had gained admittance into the opened internal jugular.³

CASE XIII.—Mr. John Adams saw a servant girl, thirteen years of age, who had fallen through a skylight, June 9th, 1862. When brought to the hospital, she was exsanguine and almost pulseless, and presented a deep, irregular wound in the right submaxillary space, from which, however, there was no bleeding. On removing the clot, a gush of blood ensued. Mr. Adams at once introduced his finger, upon which Mr. Curling enlarged the wound by dividing the skin upwards and downwards, in order that the bleeding vessel might be secured. This could not be reached, and the cavity was plugged with pieces of sponge. The edges of the wound were brought together by adhesive strips, and a compress was retained by means of a roller. On the 16th the wound had nearly united, and there had been no intermediate hemorrhage.⁵

CASE XIV.—“In wounds of this vein—internal jugular—it might be possible even to save the patient by plugging and compression, as was the case with an ancestor of the distinguished Mirabeau.”⁶

The following cases in which compression was employed were fatal, the first from secondary hemorrhage, the second from apoplexy:—

CASE I.—The late Mr. Gray has recorded the following facts: “A man was admitted into St. George’s Hospital on July 14th, 1847, having cut his throat with a penknife, which was followed by profuse hemorrhage. On the left side of the neck, a little below the cricoid cartilage, was a wound about an inch and a half in length, extending transversely across the space between the sternomastoid and trachea, partially dividing the muscles in this situation, and passing for some distance under the skin towards the clavicle. Dark blood was still welling from the wound, which was plugged with sponges, and pressure with the fingers applied. At 1 P. M. the wound was dilated upwards and downwards, no bleeding vessel was discovered, and it was evident that the bleeding proceeded from the lower end of the wound. About half a pint of blood was lost before the sponges were reapplied. The wound gradually suppurated, and the last sponge had been removed when a deep granulating cavity was seen, with a slough

¹ Malgaigne’s *Traité d’Anat. Chir. et de Chir. Expérimentale*, vol. i. p. 346. Paris, 1859.

² *Archiv für Klin. Chir.*, vol. i. p. 25. Berlin, 1860.

³ *Presse Medicale*, July 22d, 1867, p. 463.

⁴ *Mémoires de l’Académie Royale de Médecine*, vol. xvi. p. 358. Paris, 1852.

⁵ *Medical Times and Gazette*, Aug. 9th, 1862, p. 125.

⁶ Professor Pancoast, *A Treatise on Operative Surgery*, p. 47. Philad., 1852.

in the direction of the sheath of the vessels. On July 22d, at 5 P. M., the hemorrhage suddenly recurred to an alarming extent, and the patient died in the evening. On inspection of the body, a slough, completely destroying the front wall of the internal jugular vein for three inches of its extent, was found. The sloughing extended from about an inch above the junction of the vein with the subclavian, upwards: the posterior half of the vessel alone remaining. The common carotid artery had also been wounded at its anterior part: the opening was small, and was blocked up by lymph and coagulum, which was intimately adherent to the edges of the wound."¹

CASE II.—Dr. Heineken has recorded the following unique case: "A soldier in the artillery was stabbed between the condyle of the lower jaw and the mastoid process, just below the lobe of the ear on the left side. The knife with which the wound was inflicted was about two inches and a half in length, about an inch in breadth, with a slight curve at its point; and it had been plunged up to the handle. Profuse bleeding ensued, which one of his comrades stopped by pressing with his finger upon the wound, after a large quantity of blood had been lost; and he was removed to the Portuguese hospital. Upon examination the temporal artery was found to be wounded, and with considerable difficulty was secured by ligatures. Upon the removal of pressure the hemorrhage returned almost as violently as ever, and in a constant full stream of the size of a goose-quill. As the man was greatly exhausted by the large quantity of blood lost, the first object was to suppress the hemorrhage as speedily as possible; and with this intent the wound was filled with pieces of sponge, and compresses were applied over them. In two hours from the suppression of the hemorrhage he became comatose, with paralysis of the right arm and leg, and a full pulse. Twelve ounces of blood were taken from the arm, an active cathartic given, and in the evening, as the symptoms remained the same, other twelve ounces were abstracted. On the following day the same plan of treatment was persevered in, and about every eighth hour more or less blood was withdrawn, but without giving any decided relief. On the seventh day he expired apoplectic. Upon examination a wound more than half an inch in length was found in the internal jugular vein immediately below the base of the skull, and, with the exception of the temporal artery before mentioned, no other vessel, nerve, or part of consequence was injured. There was no opportunity of opening the skull."²

Objections to Compression.—The treatment of wounds of the internal jugular vein by compression is open to the same accidents as the application of the ligature, and is also attended with some inconveniences and positive drawbacks, which demand consideration.

First. Unless the wound be small, the amount of pressure brought to bear upon the bleeding orifice—the soft tissues of the neck intervening—will be so great as not only to be painful, but it will also interfere with deglutition, and more or less with respiration.

Secondly. When the compression is immediate, and made directly upon the opening, the pain inflicted will be the greater, and a suppurating cavity is produced, by which primary union of the soft parts is defeated. Moreover the sponge, charpie, or lint, will, if not removed before suppurative action is set up, confine the discharges, which will soon become offensive, and may give rise to diffused phlebitis.

Secondary hemorrhage has occurred in three instances. One of these—

¹ A System of Surgery, edited by T. Holmes, vol. ii. p. 276. London, 1861.

² Edinburgh Med. and Surg. Journ., vol. xxx. p. 103. 1828.

that of Mr. Gray—was fatal, the bleeding having recurred on the eighth day, from destruction of the anterior wall of the vessel to the extent of three inches. In this case, on enlarging the wound, no bleeding vessel was discovered; but it was evident that the blood proceeded from below, and the wound was plugged with sponges. In Case VI. of the cures by compression, bleeding recurred on several occasions; and in Case VIII., the amount of blood lost on the eleventh day was enormous.

In Case X., Table I.,¹ it is scarcely probable that Professor Langenbeck could have omitted compression: but in this, as well as in the other fatal cases, the plan of treatment is not recorded.

Apoplexy.—In one case—that of Dr. Heineken—apoplexy was the cause of death. The situation of the wounded vein was such as to preclude the possibility of applying a ligature, and the wound was plugged with pieces of sponge, over which compresses were applied. Although the man was greatly exhausted by the loss of blood, *he became comatose, with paralysis of the right arm and leg*, in two hours after the suppression of the hemorrhage from the *left* internal jugular. Repeated bleedings failed to give decided relief, and he expired apoplectic on the seventh day.

Although there was no post-mortem examination of the head in the above case, there is strong reason to believe that the cerebral disturbance was due to the means employed to arrest the hemorrhage. That the sudden cutting off of the return of one-half of the venous blood from the brain and its membranes can be followed by such an event, admits of no discussion, more especially if there be also an impediment to the venous circulation of the opposite side. When the internal jugular is fully compressed, more blood enters the cranium by the arteries than can be returned by the veins. The result of this is that the brain will suffer from engorgement of the venous system, and the effects of this congestion show themselves in one or more of the varied symptoms of an apoplectic tendency, as loss of consciousness, disordered vision, ringing of the ears, giddiness, and drowsiness. These signs are usually evanescent, disappearing as soon as the blood has found new channels of return. The free collateral circulation, of which more will be said under the head of ligation of the vein, and the presence of the cephalo-spinal fluid have, in the great majority of instances, prevented even these symptoms.

The fear of producing apoplexy, by totally occluding the vessel, prevented Professor Wattman, of Vienna, from throwing a ligature around the whole circumference of the vein, and the lateral ligature, which he practised in its stead, was followed by paralysis and loss of sensation in the upper and lower extremities of the opposite side, for several days. In his case of cure of wound of the internal jugular by compression, Professor Miller, of Louisville, referring to the hemorrhage, remarks: "It occurred

¹ See January number of this Journal, p. 44.

to us that suppression might be effected, and the patient secured against all possibility of its return, by a ligature of the jugular vein. Our recollection, however, not furnishing any precedent for such an operation, and an apprehension that the brain might suffer fatal compression from the sudden interception of so considerable a stream of reflux blood, deterred us from adopting that expedient."

Dr. Gurlt narrates a case of compression of one jugular vein by a tumour, attended with symptoms of congestion, as headache, dimness of vision, flashes of light, and enlargement of the subcutaneous veins.¹ As a rule, however, signs of cerebral disturbance are to be looked for in those cases only in which the obstruction to the return of blood is sudden. In the instances of Haller, Lardner, Hodgson, Warren, Smith, Horner, McClellan, Langenbeck, Simson, Ulrich, and other writers, the vein was obliterated by morbid growths, and in none of these were symptoms of cerebral congestion present.

In connection with these cases it is interesting to note that apoplexy has also resulted from the interrupted circulation of both jugulars. Sir Astley Cooper performed some experiments upon rabbits by tying both jugulars. On the seventh day one rabbit was convulsed and frequently rolled over. The voluntary powers were lost, as well as sensation to a great degree, and death took place. A clot of blood was found in the left ventricle. "Hence it follows that apoplexy will follow occasionally an obstruction to the return of blood, and this I have known to happen from enlargement of the glands of the neck of a boy."² Mr. John Bell also relates an example of a tumour of the neck producing a similar result.³ Dr. Abercrombie narrates the following instances of apoplexy referable to interrupted circulation:—

"A boy mentioned by Zitzilius had drawn his neckcloth remarkably tight, and was whipping his top, stooping and rising alternately, when, after a short time, he fell down apoplectic. The neckcloth being unloosened, and blood being drawn from the jugular vein, he speedily recovered. Kortum mentions a Swedish officer, who, to make his men look well in the face, obliged them to wear their collars very tight; the consequence was, that, in a few years, half the regiment died of apoplexy. Strangulation, when the neck is not dislocated, seems to be simply apoplexy. A man, brought after execution to Sauvages, was recovered by three bleedings, sat up and talked, his breathing and deglutition being natural. After a short time, the part of his neck where the cord had been applied began to swell, so as evidently to impede the circulation in the veins of the neck; he became drowsy, his pulse and respiration slow, without dyspnoea, and in a few hours he died apoplectic. A woman, mentioned by Wepfer, recovered after execution under the same treatment. After her recovery, she was for some time affected with vertigo, which subsided gradually."⁴

Instrumental compression, I may suggest, may be substituted for plug-

¹ Archiv für Klin. Chirurg., vol. i. p. 59.

² Guy's Hospital Reports, vol. i. p. 471, 1836.

³ Principles of Surgery, vol. ii. p. 556.

⁴ Edinburgh Med. and Surg. Journal, Nov. 1818, p. 572.

ging and external compresses when the vessel is visible. For this purpose small spring forceps may be used to which a string is attached to facilitate its removal. In this way Mr. Porter controlled bleeding from the femoral vein in a thigh amputation, the small artery forceps of Dieffenbach having been pulled away in forty-eight hours.¹ By the use of such a contrivance for a wounded internal jugular vein, the pain will be less than after filling the wound with charpie or sponge, and the amount of suppuration will be much diminished.

It is to be remembered that an incomplete wound, unless very small, will furnish more blood than a wound entirely dividing the coats of the vessel, as the contraction of the fibrous elements of the vein causes the orifice to gap and assume a somewhat oval shape. The rule of practice should, therefore, always consist in following the example of the ancients, namely, complete division of the vessel so as to permit each end to retract within its sheath. By such a procedure the bleeding will be much diminished, and, in conjunction with any of the modes of compression, will favour the chances of a successful issue.

II. LIGATION.—The obliteration of the cavity of so large a vein as the internal jugular would at first sight appear to be a formidable operation, not only on account of the supposed dangers of phlebitis, but also from the effects of impairment of the cerebral circulation. The only attempts to collect these cases have been made by Professor Gibson, of this city, who narrates six examples, including his own;² and by the late Professor Malgaigne, who has reported sixteen cases, embracing those of Dr. Gibson.³ It is to be regretted that M. Malgaigne has made but mere allusion to the facts which he had gathered; but they were sufficient to warrant him in concluding that ligation of the vein was not more dangerous than that of the carotid artery.

With the exceptions above mentioned, the great majority of cases of ligation of this vein seems to have escaped the attention of surgeons, so much so indeed that Mr. O'Shanghnessy, in reporting his own case, thinks it the first successful instance on record. In this, however, he is greatly mistaken, as ten instances precede him. Although to Professor Simson is due the merit of priority, it will be found that the measure was alluded to, but not carried into effect, before he reported his case in 1747. Thus, in 1563, although we have not been able to find the edition of that year, Thomas Gale writes:—

"The fourth manner of stitching is, when as a veine or arterie is cut, and we use to stae the flux of blood, especiaillie when as vene jugularis

¹ Dublin Quarterly Journal. Nov. 1863, p. 268.

² Institutes and Practice of Surgery, 8th edition, vol. i. p. 200. Philadelphia: Kay & Bro. 1850.

³ Op. cit., vol. i., chapter x., pp. 341-346.

is cut. Then we thrust ye needle through that veine or arterie and then knit the same with the threed, then drawe out the needle, and let a portion of the threed hang out so long untill it falleth awaie."¹

Heister advises to treat small wounds of the internal jugular vein with dry lint, which is to be confined with a compress and roller; but of large wounds he says:—

"I would advise him (the surgeon) to make a pressure upon the divided vein with his finger, and to enlarge the wound upwards and lengthways, till he can come at enough of the vessel to make a strong ligature upon it by the assistance of a crooked needle. By this means the life of the patient may be saved, though the course of the blood through the vessel be entirely cut off. I have often tried this experiment upon a dog, and he has recovered, and never suffered any apparent inconvenience from it; therefore I think it is better to put this doubtful remedy into execution than to leave the case as desperate."²

Fabricius ab Aquapendente inculcates the precept of Celsus in speaking of wounds of the carotid artery and internal jugular vein, when he says:—

"Si sanguis sistere non potest, statim debet hamo apprehendere vas vulneratum et attollere, deinde partes utrinque filo ligare, et transversum totum vas præscindere."³

Even those authors who are opposed to the general application of the ligature to wounded veins admit that it will be required when the internal jugular is involved. Mr. Erichsen, writing of the introduction of air, advises

"The first thing to be done is to prevent the ingress of air, by compressing the wounded vein with the finger, and, if practicable, securing it by ligature."⁴

It may be inferred from the preceding remarks that the jugular vein will require a ligature to prevent alarming and fatal hemorrhage and as an expedient against the introduction of air, both of which occurrences demand some investigation.

1. *The introduction of air* into the heart through an open jugular vein is much more to be feared than hemorrhage; and the reported cases show that it is more liable to occur when the vein has been opened near its entrance into the brachio-cephalic, as at this point, as well as throughout nearly the whole of the lower third of its extent we have the phenomenon of "venous inspiration," the blood and air being freely sucked into the

¹ Certaine Workes of Chirurgie, newlie Compiled and Published by Thomas Gale, Maister in Chirurgerie. London, 1586. The first Book of the Enchiridion, p. 35.

² A General System of Surgery, 2d edition, p. 76. London, 1745.

³ Opera Chirurgica, p. 251. 1723.

⁴ Edinburgh Medical and Surgical Journal, January, 1844, p. 19. Science and Art of Surgery, p. 147. Phila. 1859.

heart at each inspiratory effort. The aspiration of air has been the invariable result of an incised wound, made by the surgeon in the removal of tumours in ten instances, and once in raising up the vein, which had been divided in a suicidal attempt, to tie it. In the latter case the air was heard to enter the vein, but there were no general symptoms referable to the accident. In the cases of Wattmann, Smith, Asmus, Mirault, Brodie, and Erichsen, as may be seen by consulting Table No. II., not only was the peculiar lapping or whizzing noise heard, but there were alarming signs of trouble of the organs within the chest, as immediate syncope, tetanic spasms, and opisthotonos. A fatal result occurred after the application of a thread in the case of M. Mirault only, death ensuing from asphyxia in a little more than three hours. Two other cases of the accident, cured by pressure, have been considered at page 316; and three examples of fatal issue at page 38, January number of this Journal. It is thus seen that the accident is by no means very frequent, or necessarily fatal. The occurrence of eleven cases in eighty-six of wounds of the internal jugular vein, treated of in this paper, gives a ratio of 12.79 per cent.; four cases, or 36.36 per cent., were fatal, while seven cases, or 63.63 per cent., recovered under suitable treatment.

Treatment.—The possibility of air finding its way into the heart through a wounded vein, should teach the surgeon to avoid the accident as much as possible, more particularly in his operative procedures about the root of the neck, where the suction force of inspiration is present. Should an opening be made in that point of the vein, without the necessary precautions having been taken, sudden death may ensue, as happened in the cases of MM. Gorré and Ulrich. The conditions most favourable to the production of the accident are the canalization of the vessel from inflammatory thickening of its walls, preventing their collapse when divided, and a patulous condition when cut through, owing to its normal attachments to the surrounding fascia. When the vein is imbedded in or is firmly attached to a tumour, the accident has usually followed the division of its pedicle; but an incomplete division with traction on the tumour, by which the orifice is kept open, is equally to be feared.

The *preventive* measures refer to the avoidance of all the causes which tend to produce the accident, and the infliction of a wound upon the vessel, so that in the removal of deep-seated tumours of the neck, in which the vein is involved, the precaution must be taken either to compress the vessel with the finger, or to cast a thread around it on the cardiac side of the tumour, before it is divided. This ligature of expedience must never be withheld, no matter what the peculiar views of the surgeon may be in regard to it. The *curative* measures have for their first object the prevention of further admission of air. The vein having been accidentally opened, or completely divided, the finger must at once be placed on the wound and a ligature applied on the cardiac extremity. In this way four of the five

cases of ligation terminated successfully, the amount of air introduced into the circulation not having been sufficient to produce its purely mechanical effect of obstructing the capillaries of the lungs. In all cases in which a ligature is required on the continuity of a vein, two threads will generally be found necessary, with or without the intermediate division of the vessel, the upper one to guard against hemorrhage, the lower to prevent the accident under consideration; and the same remark will apply to those cases where the vein is simply punctured or completely divided. The other means merely refer to those measures employed for alarming syncope, and do not require discussion.

2. *Hemorrhage*.—From the large size of the internal jugular vein, the absence of valves, and from the current of blood passing from above downwards, it is naturally to be expected that a large wound, resulting in complete or almost complete division, will furnish a very large quantity of blood from the peripheral or distal end, as well as from the cardiac end during expiration. In all the cases, where this occurrence has been mentioned, it is stated as having been “very profuse,” or “very copious.” In the case of Professor Miller, Case VIII., p. 309, the amount was estimated to be about one gallon. In the only case that I have witnessed, occurring in the practice of Professor Gross, a large vein, probably the facial, was sliced off, so to speak, at its point of entrance into the jugular, leaving a large round opening from which a copious and very embarrassing stream of blood escaped, and which was with some difficulty arrested by the application of two ligatures, one above and the other below the opening. Hemorrhage may be the cause of death primarily or secondarily. The former occurrence was seen in but four cases, or in 4.65 per cent. of the whole number; the longest duration of life being a little more than one hour. The case of Mr. Samuel Cooper is interesting from the mode of fatal termination; the subcutaneous hemorrhage having induced suffocation by pressure on the trachea. Secondary hemorrhage was fatal in ten cases, or in 11.62 per cent. of the whole number; six times, or 6.97 per cent., when no ligature was employed, and four times, or 4.65 per cent. when it was adopted, the bleeding having come on in a period varying from four to fifteen days. Taking the whole number of cases then at 86, and the whole number of deaths from hemorrhage at 14, we shall find that hemorrhage has been the cause of death after wound of the internal jugular vein in 16.27 per cent. of all cases. There were in all 37 deaths, which give the ratio of 37.83 per cent. of all the fatal cases referable to hemorrhage.

It is interesting to note that in three cases of wound of the vein the bleeding was reflux, requiring a ligature on the cardiac side only, as the upper end did not emit blood. In other cases where but one ligature was used, the upper end, and not the lower, required deligation. Indeed cases have been reported of the removal of a portion of an internal jugular vein with a tumour, in which there was no hemorrhage from either end, the cavity

of the vessel having become obliterated. A case of this nature occurred to Dr. Danzel, of Hamburg, who removed a portion of the vein with an encephaloid tumour of the neck, without any hemorrhage, the vessel having been closed by the pressure of the tumour.¹

Treatment.—For the arrest of hemorrhage the ligature has been employed much oftener than compression, and with the best results. The mode of applying the thread has already been referred to; but it is to be remembered that reflux bleeding may occur from the cardiac end, so that it is advisable to use two ligatures in every case, the more so if the wound be closed before the effects of chloroform have passed off, as in such a case it may happen that the divided vein will not bleed until the patient has completely recovered, as was witnessed by Mr. O'Shaughnessy. The precaution must also be taken, in throwing the thread around the lower end, to prevent the introduction of air, which happened to Mr. Erichsen when the vein was raised to tie it.

Temporary ligation may be employed by those surgeons who fear the effects of a permanent thread, to dispense with digital compression when the vein has been wounded. In such an event the bleeding is very embarrassing to the operator in his deep dissections, and as the fingers of an assistant would only be in his way, a thread may be applied with a slip knot, so that it can be removed on the completion of the operation. Or, instead of this, very delicate spring forceps, or the modified serres-fines of M. Vidal, may be used, and will be found to answer a good purpose.

Permanent ligation is the measure which above all others recommends itself in the treatment of wounds of this vein, as it does away with the pain and other inconveniences of compression, as well as acts as a barrier to the extension of local inflammation from unhealthy suppurating wounds, as I have pointed out in the January number of this Journal. The ligature may be applied in two ways, namely, merely to include the wounded part, when it is known as *lateral*, or to include the whole circumference of the vessel, when it may be termed *direct*.

Lateral ligation was first practised by Mr. Travers, in 1816, for a small wound of the femoral vein, and first applied to the internal jugular by Dr. Wattmann, in 1823. It does not obliterate the vessel, as was shown by Mr Guthrie in his case of suicidal wound. The cut was picked up with a tenaculum, and a delicate thread thrown around it. On the ninth day the man died of exhaustion consequent upon secondary hemorrhage from the common carotid artery, when the vein "was found pervious and without a mark indicating where the ligature had been applied." Professor Pancoast, of this city, advises when a vein is punctured to pass a couple of fine pins through the edges and across the orifice, and to embrace the opening in a delicate silk ligature, and then withdraw the pins;² a pro-

¹ Archiv für Klinische Chirurgie, vol. vii., 3d Part, p. 887. Berlin, 1866.

² A Treatise on Operative Surgery, p. 47, 3d Edition. Philadelphia, 1852.

cedure manifestly-inapplicable to a vein of such magnitude as the internal jugular, as the hemorrhage will prove too embarrassing, and will not admit of the time required to carry the procedure into effect. It will be better to use the common spring forceps to nip up the opening, as the instrument at the same time possesses the advantage of controlling the bleeding. This mode of applying the thread would seem to recommend itself from the fact of its not interfering with the cavity of the vessel, whereas the direct ligation obliterates it.

Lateral ligation is, however, dangerous, and should be excluded from practice.—By referring to the tables of ligation of the internal jugular vein, it will be seen that Cases 22, 23 and 24, in which it was employed, were fatal from secondary hemorrhage towards the sixteenth day; and it is also very probable that it was used in Case 21. Were these cases excluded from the tables, there would be no deaths to record from secondary hemorrhage. It has also proved to be the cause of death in several instances of tied femoral veins, and must, therefore, be discarded from practice; although the successful cases of Guthrie, Bégin, and Wattmann show that it is by no means to be regarded as an entirely unsafe procedure.

Direct or complete ligation was first practised by Professor Simson, of St. Andrews, Scotland, and is the method which should always be employed. Nothing need be said of the mode of applying the thread, as it is merely the ordinary procedure, excepting that the forceps are to be preferred to the tenaculum for picking up the vein, not only to arrest hemorrhage, but to guard against the introduction of air. A delicate silk thread should be used, and one end clipped off close to the knot.

3. *Ligation of the Corresponding Artery.*—In the very interesting paper already alluded to, Professor Langenbeck advises ligation of the corresponding artery for wounds of the internal jugular, axillary, external iliac and femoral veins, when compression has failed to arrest the hemorrhage. He does not favour tying the internal jugular vein, as it entails, he thinks, the dangers of thrombosis and pyæmia, and would prefer giving a trial to ligation of the carotid artery, paying no attention at all to the wound of the vein.¹ Professor Langenbeck considers this a sure means; but by what process of reasoning, with all due respect for the author, I have been unable to discover. Indeed, he seems to have but little confidence in his own statement, since, if he had, he would have trusted to it in the case of the little girl, given at page 69 of his paper, instead of applying two threads to the jugular vein. The suggestion of Professor Langenbeck is not a new one, as Dr. Heineken had alluded to it in connection with the case detailed at page 311, in which the internal jugular had been opened to the extent of half an inch, just below the base of the skull. He remarks: "The only chance of preventing the accident from proving fatal

¹ Archiv für Klinische Chirurgie, Band i. p. 52 et seq.

consisted in permanently reducing the supply of blood to the brain. This might have been attempted by tying the carotid on the same side, and, had evidence of pressure on the brain still continued, by putting a ligature around the other carotid also."¹

The ligation of one carotid artery does not prevent the access of blood to the brain, as the ligation of the femoral artery would cut off the supply of blood from the lower extremity. The intra-cranial circulation is peculiar; there is a free communication between all the vessels, a wise provision, which, if it did not exist, would leave us no remedy for wounds of the vessels of the neck. Ligation of both carotids might answer the purpose, as suggested by Dr. Heineken, as the blood carried into the brain would have to traverse the vertebral arteries, which being contained in bony canals would not enlarge. The supply of blood through these channels being small, time might be given for the wound of the vein to heal; but no one, I presume will be found bold or foolish enough to carry the suggestion into effect when a ligature on the vein or compression will accomplish the object. In the last case of the second table, in which a cyst was removed from the neck, the carotid artery was laid bare to a short extent, and gave me an opportunity of compressing it firmly against the spine. I need hardly say that it had no effect whatever on the bleeding jugular. It may be added, however, that the procedure advised by Professor Langenbeck has been attended with success in wounds of the veins of the extremities, and that he has supported his opinion by the narration of a case of wounded femoral vein, the coats of which were so brittle as not to hold a thread. The hemorrhage was rebellious, but was stopped by ligating the femoral artery. I have collected several analogous cases, which will be reported at a future date.

Effects of Ligatures on Veins.—There is a very decided difference of opinion in regard to the action of a ligature upon the coats of a vein. Mr. Hodgson says: "When a vein is tied with a thin ligature, the internal surface of the vessel is lacerated;"² and Mr. Travers demonstrated that "a ligature does not divide the internal tunic of a vein either in man or animals."³ This non-division of the lining membrane had been pointed out by Bichat;⁴ but Mr. Travers also showed that it was thrown into longitudinal folds, and that "it appears as if the outer or cellular coat only was divided;" an opinion that has been generally adopted by the profession. From some experiments upon the larger human veins, which may be repeated and verified by any one, I have been led to different conclusions. When a delicate, strong, and well-waxed silk thread is drawn as tightly as possible around a vein, its coats become plicated or thrown into

¹ Edinburgh Med. and Surg. Journ., vol. xxx. p. 104. 1828.

² On Diseases of Arteries and Veins, p. 555.

³ Essay cit., p. 201.

⁴ General Anatomy. Translated by Dr. Hayward. Vol. i. p. 402. Boston, 1822.

longitudinal folds or plaits. Upon slitting open the vessel, these folds are seen to be well marked, but without any division of the tunics; and upon holding the vessel between the eye and light, a decided transverse furrow or indentation, corresponding with the site of the ligature, is observable, which would, at first sight, seem to be due to injury of one or more of its coats. The external and internal tunics can be made to glide over the furrow by the finger, showing that some lesion exists in the middle coat, and a mere superficial examination will lead to the opinion that it has been completely divided. A more minute inspection and dissection, however, clearly disclose that the inner layer, consisting of circular elastic fibres, only has been cut, or rather separated, leaving the longitudinal fibres unharmed and closely connected with the uninjured external tunic. With the exception then of the impression made upon a portion of the middle layer, none of the coats of the vein suffer division. The external tunic seems to be as strong as that of an artery in resisting the ligature; the middle coat differs from that of an artery in having longitudinal as well as circular fibres, the former being composed of white fibrous tissue with elastic fibres, the latter of elastic fibres arranged in the same manner as those of an artery, with an admixture of a large quantity of unstriped muscular fibres. The inner tunic is more dense and tough, but not nearly so lacerable as that of an artery, and can be stripped off the middle coat much more readily and to a greater extent. I have, indeed, peeled off one unbroken surface of upwards of two inches from the inferior cava, and on applying a ligature to it, it suffered no division. It is thus seen that the anatomical structure of a vein materially differs from that of an artery, and that, when tied, none of its coats are divided, as is the case with the latter vessel. It is, moreover, easy to conceive that the walls of the vein being thrown into folds, offer a mechanical obstacle to their own division by a tightly drawn thread.

From the experiments of Mr. Travers¹ upon the jugular vein of the horse, it is found that up to the sixth day the vein on each side of the ligature is thrown into longitudinal folds, the lower portion being empty, collapsed, and uninflamed, the upper extremity being filled with a firm coagulum of several inches in extent. The lining membrane shows not only no blush, but no signs of adhesive inflammation or adhesion of the contiguous folds, while the cellular sheath of the vein is thickened by a deposit of lymph in the vicinity of the ligature. The appearances are the same when the vessel is divided between two ligatures, the division permitting the ends to retract to the extent of an inch. At seven days the effusion of lymph into the cellular tissue around the ligature is increased, and the thread is surrounded by adhesive matter external to the vessel. At nine days ulceration of the venous walls begins, and the separation of the

¹ See Surgical Essays, London, 1818, Part I. p. 273, *et seq.*

ligature is accomplished in a period of from fifteen to twenty-five days. In a young and healthy horse the thread came away on the twenty-fifth day.

"The ulcerated ends of the vein formed a crescentic sweep, and were separated to the extent of an inch, and fastened by adhesion to the cellular sheath, which was much extended and thickened by a subjacent deposition of lymph, so as to form a smooth, solid bed between the divided ends of the vein. The internal membrane of the superior portion of the vein had a thin, ragged edge where it had been severed by ulceration. The lower edge was smooth and blended in with the bed of the wound. The extremities had undergone no contraction but that produced by the adhesion of the severed extremity to the sheath. The portion of the vein next the heart was empty. The upper was filled by a dark lamellated coagulum of blood, adhering very strictly to the internal tunie which was discoloured by it. On carefully separating the outer lamella which coated the interior of the vein, I could not discover any thickening of the proper coats of the vein, nor any appearance of inflammatory action within its canal, nor was any such appearance indicated in the lower portion of the vein." pp. 274-5.

From the above changes in the coats of the vein, Mr. Travers infers that the internal coat is little susceptible of inflammatory action, and that the healing process, as well as the dropping off of the ligature by ulcerative action, is conducted without any appreciable sign of inflammation of the lining membrane. Indeed, he says "the veins do not adhere after being tied; nor do their wounds under ordinary circumstances cicatrize immediately, nor do the cut ends contract and inflame." These opinions are opposed to those of Bichat, Mr. Hunter, Mr. Hodgson, Dr. Mackenzie, and other observers, and the phenomena described by Mr. Travers are undoubtedly due, if not to inflammation, to an irritation closely allied to that condition.

Finally, to sum up the changes produced by the application of a ligature, it is found that none of the tunies are divided; that the blood in the interior of the vessel becomes consolidated on the distal side of the thread; that adhesive inflammation sets in, followed by effusion of plastic material in the coats of the vessel, between the coagulum and the lining membrane, and in the surrounding tissues; that the vessel on the proximal side is closed without the formation of a coagulum; and that the clot undergoes various changes, becomes organized, and with the corresponding walls of the vessel is ultimately converted into a firm fibro-ligamentous cord.

Collateral Circulation.—As some bad consequences, namely—capillary venous congestion, serous effusion, apoplexy, softening of the brain, paralysis, and œdema of the soft parts—have been referred to the sudden interruption of the return of venous blood from the brain and its membranes to the heart, by the application of a ligature to the internal jugular vein, it will be necessary to glance at the collateral circulation. Some of the cases have been attended by signs of venous congestion, but there is an

anatomical arrangement by which the brain escapes danger. All the sinuses of the dura mater communicate with each other at the torcular Herophili, from which the lateral sinuses pass to the posterior lacerated foramina, to become the internal jugular veins, so that if one be obstructed the current of blood is directed to that of the opposite side. The anterior and external jugular veins are supplemental trunks and have free communications with the former set. The veins of the walls of the cranium have a direct anastomatic communication with the sinuses of the dura mater, and the rachidian system of veins also freely inosculates with the cerebral veins, so that they afford great aid to the circulation. Of the latter plexus, indeed, M. Cruveilhier remarks: "If all the jugular veins were obliterated, the venous circulation of the head would still continue, and would be carried on by the spinal veins."¹

It is thus obvious that when one internal jugular vein is tied, the blood will find its way to the heart by the internal jugular of the opposite side, and by the external jugular of the same side. The latter vein I have seen, in several cases of tumours of the neck compressing the deep jugular, very much enlarged and tortuous, and that condition is, therefore, to be considered as the best diagnostic sign of the internal jugular being involved by morbid growths. From these considerations, and from the fact that many cases of obstruction of one jugular vein by tumours have been unattended by signs of cerebral congestion, that state is not to be anticipated whenever a ligature is deemed necessary; although, as will be seen hereafter, the procedure gave rise to symptoms denotive of the occurrence of venous congestion in one instance.

In addition to the above indirect anastomoses, a beautiful example of direct communication between the ends of a tied jugular vein of a horse, has been observed by MM. Renault and Bouley. The animal was killed thirty days after ligation of both internal jugulars. Two collateral veins arising above had carried on the circulation; but whereas, before ligation, they had carried blood to the jugular, their function was now changed, since they received the blood from its upper end, and carried it to a venous network developed entirely around the tied vein at the site of the thread. This venous rete was composed of vessels of the size of small quills, freely communicating with each other, their united diameters being fully equal to that of the obliterated vein itself. Two other main trunks left this network, and emptied into the lower end of the jugular below its point of obliteration.²

From the above description this case would, I think, resemble the figure of a tied carotid artery, delineated by Dr. Ebel, in which precisely the

¹ Anatomy of the Human Body. Amer. edition, p. 611. New York, 1844.

² Recueil de Médecine Vétérinaire, vol. xvii. p. 547; and Malgaigne, vol. i. p. 340.

same condition existed.¹ A similar anastomosis between the ends of the femoral vein of a dog, which was killed on the thirty-seventh day after ligation of that vessel and the femoral artery, is described by Dr. Jones. "The vein was obliterated to a greater extent than the artery, and the superior and inferior portions communicated freely by branches which went from one to the other."²

The following are brief abstracts of all the cases of ligation of the internal jugular vein which I have been able to collect. Twenty-eight refer to the extirpation of tumours; five to suicidal wounds; one to gunshot wound; two to stabs; two to ligation of the carotid artery; and in three cases the cause is not mentioned. For more easy consultation, as well as to point out the sources from which they have been gathered, the cases are separated into two tables; one relating to the vein alone, the other to the vein and the carotid artery; an arrangement which has been deemed necessary for the proper appreciation of some of the assumed dangers of ligation. It is to be remarked that there is one case on record, which has not been used in this paper as it has no practical value in a statistical inquiry, of *ligation of the vein by mistake*. Mr. Crisp reports it as follows: "A case has recently come to my knowledge where a surgeon tied the vein instead of the artery, and the mistake was not discovered until after death. The patient was a child, and the operation was required for hemorrhage, resulting from an abscess in the neck."³ The result of such treatment would necessarily be an increased instead of diminished flow of blood.

CASE I.—Dr. Thomas Simson, Professor of Medicine in the University of St. Andrews, Scotland, records the first instance of the application of a ligature to the internal jugular vein, which was required during the extirpation of an ulcerated tumour of the right side of the neck, in which the vessel was imbedded. Professor Simson says: "In dissecting out this tumour, I laid the carotid artery bare for about two inches, and plainly saw its pulsation; as it sends out no branches about this part of the neck, I wrought with greater resolution. From the upper part of the tumour a cartilaginous process went to the larynx, to which it was strongly attached. In cutting this away, there was a strong jet of blood from an artery, which soon stopped, after the application of spirit of wine to it, so that I went on with the dissection of the tumour from the vein downwards. After laying the vein bare a considerable way, I found it confounded at the lower part with the substance of the tumour; and therefore, putting a ligature around the vein, I tied it, and then cut away the remaining part of the tumour below, except a small part, in which I thought the vein was involved, expecting the ligature would make this fall off; but seeing no appearance of such a separation, after eight days, I cut it through immediately below the ligature, and found vein and all quite solid, of a cartilaginous firmness. After this hard substance was all taken away, the large cavity where the tumour had been lodged filled up very fast, so that the wound was cicatrized in six weeks."

CASE II.—Mr. Simmons, of Manchester, England, "has also published a case in which he tied the internal jugular vein. In this case a large tumour on the

¹ De Natura Medicatrice sicubi Arteriae Vulneratae et Ligatae Fuerunt. Giess. 1824.

² Treatise on Hemorrhage, p. 150. London, 1805.

³ Op. cit., p. 217.

left side of the neck extended from the outer margin of the sterno-cleido-mastoid muscle nearly to the shoulder. The tumour was extirpated. 'The divided arteries bled freely, but the blood rushed in a torrent from the internal jugular vein, which had been divided in the operation.' The vein was tied with three ligatures, which came away in due time without hemorrhage, and the parts healed in about two months. In this case it was remarked that no morbid affection of the head was the consequence of the obliteration of the internal jugular vein."

CASE III.—Dr. Richter, treating of wounds of the neck, in his "*Aufangsgründe der Wundarzneykunst*," states that the internal jugular vein has been ligated with a happy result.

CASE IV.—Professor Wattmann, of Vienna, applied a lateral ligature to the right internal jugular, in removing a tumour of the neck. Although air had entered the vein, the patient gradually recovered, his left upper and lower extremities having been paralyzed for several days. The thread came away on the twelfth day.

CASE V.—Professor Stevens, of New York, embraced the internal jugular vein with two threads, above and below the entrance of a large divided vein, during the extirpation of an adenoid tumour of the neck. The patient recovered, and the ligatures came away on the fourteenth day.

CASE VI.—The late Professor Mott removed a tuberculated sarcomatous tumour of the neck, the hemorrhage requiring the ligation of the internal and external jugular veins and the external carotid artery. A small portion of the growth was included in the ligature around the internal jugular, and the woman recovered.

CASE VII.—Professor Gibson, of this city, tied the internal jugular with two threads, and divided the vessel between them, in the extirpation of an adenoid tumour of the neck. Previous to the operation the common carotid artery was ligated as a precaution against hemorrhage, and during the operation the descendens noni nerve was cut across, as it was in the way. The threads were pulled away from the vein on the thirty-third day, and the ligature came away from the artery three days subsequently. The boy made a good recovery.

CASE VIII.—Dr. J. G. Morgan, of New York, applied two ligatures to the internal jugular, which had been divided in about three-fifths of its circumference in an attempt at suicide. The bleeding was frightful, but the man's life was saved, the threads coming away on the eighth and tenth days.

CASE IX.—The late Professor J. C. Warren, of Boston, during the removal of a tumour, tied the internal jugular with two threads, a portion of the vein being left in the growth. The common carotid artery was also ligated, and the patient recovered.

CASE X.—M. Mirault, of Angers, removed a tumour from the neck. Air was aspirated, and a ligature was applied on the cardiac side to prevent its further ingress. Death ensued in three hours. For farther particulars see Case III. of fatal cases from introduction of air, in the January number of this Journal.

CASE XI.—Dr. Asmus opened the internal jugular vein in an operation for the removal of a tumour of the neck, and air was aspirated, followed by immediate syncope with convulsions and violent opisthotonos. The patient recovered from the primary effects of the introduction of air in twelve minutes, under the use of stimulants, pressure having been kept up with the finger applied to the orifice of the wounded vessel. The upper end of the vein was tied, and the man made a good recovery.

CASE XII.—Dr. A. B. Mott, of New York, included the internal jugular in two threads, a piece of the vessel having been cut out in a suicidal attempt.

When first seen, the young man was pulseless from loss of blood, and had to be resuscitated by artificial respiration. He however recovered, the ligatures coming away on the twelfth and thirteenth days.

CASE XIII.—M. Maisonneuve, of Paris, tied the distal end of the internal jugular vein, which had been divided in the removal of an enormous tumour of the neck. The man recovered.

CASE XIV.—M. Widmer, on the authority of M. Velpeau, has successfully ligated the internal jugular.

CASE XV.—M. Gély, on the authority of M. Malgaigne, met with recovery after ligation of the internal jugular.

CASES XVI., XVII.—M. Sédillot has in two instances ligated the internal jugular, leaving a portion of the vein in glands of a suspicious nature. Both patients recovered.

CASE XVIII.—M. Bégin, on the authority of M. Légnest, had a successful issue in a case of lateral ligation of the internal jugular.

CASE XIX.—Professor Barovero, of Turin, accidentally included the *left* internal jugular vein in the ligation of the common carotid for the suppression of hemorrhage from an encephaloid tumour situated behind the right angle of the jaw. Up to the tenth day there was giddiness, spectral delirium, and palsy of the left side of the mouth and the left hand. On the sixtieth day, symptoms of gastric fever set in, which speedily assumed the tertian form, and "acquired a pernicious character in the course of a few days, with loss of sensation, sopor, and death on the sixty-ninth day after the operation." The brain and its vessels were found in a state similar to that of chronic inflammation; and the anterior part of the *right* lobe was covered by a fluid similar to a puriform exhalation.

CASE XX.—Mr. Guthrie tied the internal jugular laterally in an attempt at suicide. The cut was picked up with a tenaculum, and a fine thread applied. The common carotid artery was nicked transversely, but the incision did not extend beyond the middle coat. On the eighth day hemorrhage took place from the artery, which was cut down upon and ligated, but the patient died on the following morning from exhaustion. "The internal jugular was found pervious, and without a mark indicating where the ligature had been applied."

CASE XXI.—M. Giraud has recorded a case in which a French military surgeon, at Toulouse, tied the trunks of the internal jugular and common carotid for a gunshot wound. The man had no unfavourable symptom as far as the sixth day; but it is not stated whether he recovered.

CASE XXII.—M. Labat, on the authority of M. Larrey, in his "*Mémoire sur l'Adénite Cervicale*," ligated the internal jugular and common carotid, and divided the pneumogastric nerve in removing a very large scirrhus tumour of the neck, and the patient recovered in six weeks. The external jugular was also tied.

CASE XXIII.—Sir Benjamin Brodie applied two ligatures to the internal jugular in the removal of a tumour. Air had gained admission into the vein, but the patient recovered.

CASE XXIV.—Mr. Erichsen tied the internal jugular above and below a wound made in a suicidal attempt. The man made a good recovery, notwithstanding air was heard to enter the vein when it was raised to tie it.

CASE XXV.—Professor Pancoast, of this city, applied two ligatures to the internal jugular in extirpating the parotid gland. The internal carotid artery was also tied, and the man recovered.

CASE XXVI.—Professor N. R. Smith, of Baltimore, tied the internal jugular on its cardiac side, near its termination, on account of appalling recurrent hemorrhage in the removal of a medullary sarcoma of the neck. The vessel was involved in the disease; its coats soft and brittle, and, near its junction with the subclavian vein, had been largely rent by the slight traction made upon it. Air had been aspired. Death from exhaustion on tenth day. "It is manifest, therefore, that he could not have died from phlebitis, which by some is supposed almost necessarily to arise from the application of ligatures to veins of such very large size, and in a diseased condition."

CASE XXVII.—M. Sanson, on the authority of M. Malgaigne, reports a fatal case from hemorrhage upon separation of the ligature of the internal jugular.

CASES XXVIII., XXIX., XXX.—M. Roux, on the authority of M. Nélaton, tried lateral ligature of the internal jugular in three cases. The threads came away towards the sixteenth day, and all perished from secondary hemorrhage.

CASE XXXI.—Dr. Neudörfer, of the Austrian army, in a conversation with the author of this paper, early in August, 1866, remarked that he had applied two ligatures to the internal jugular during the removal of a tumour of the neck, and that death ensued from causes unconnected with the procedure. In fact, the post-mortem inspection showed that the vein had undergone no change whatever.

CASE XXXII.—Professor Schuh, on the authority of Dr. Neudörfer, tied the internal jugular with two threads in extirpating a tumour of the neck. The patient died, but the vein was healthy.

CASE XXXIII.—The late Professor Mott, in the removal of a very extensive glandular tumour of the neck, tied both ends of the internal jugular. About three inches of the vein were imbedded in and taken away with the mass. The middle third of the sterno-cleido-mastoid muscle was also removed, and the boy, five years of age, made a rapid recovery.

CASE XXXIV.—Professor Langenbeck, of Berlin, in a case of extirpation of the tumour of the neck, applied two ligatures to the internal jugular, a portion of which was excised with the mass. The girl died on the twenty-fifth day, having had all the symptoms of pyæmia. A post-mortem examination was not permitted.

CASE XXXV.—Professor Langenbeck wounded the internal jugular during the removal of an epithelial cancer, and placed a thread on the cardiac end only, there being no bleeding from the distal extremity. The common carotid artery being intimately connected with the morbid growth was included in two ligatures and divided. At the time of the operation the man was suffering from bronchitis, from which he died on the twelfth day.

A post-mortem examination showed the vein completely healed as if by the first intention, without the slightest trace of redness, thickening of its walls, or the formation of a clot. The vessels of the dura mater and surface of the brain were slightly injected, and there was a little serous effusion at the base of the skull. The lungs were slightly cedematous, and at the apex of the right lung there were old tubercular deposits. The bronchial tubes were filled with mucus, and there were some pleural adhesions.

CASE XXXVI.—Professor Langenbeck reports a case similar to the above, in which the internal jugular and common carotid were tied. The man was sixty-five years of age, and the puncture of the vein was very small. As the bleeding from the upper end ceased of itself when the cardiac side was ligated, nothing was done to it. Towards the completion of the operation, there was significant hyperæsthesia, so that the patient complained greatly on stitching the wound. His pulse was weak, but the temperature on each side of the head was the same. He gradually sank and died at the expiration of forty-eight hours. An accurate examination of the ligatured vessels showed nothing

abnormal. A nerve had been included, thus accounting for the increased sensibility. The lungs were œdematous, and the bronchial tubes contained a slight quantity of mucus. The brain and other organs were normal.

CASE XXXVII.—Professor Gross, in August, 1866, removed an encysted tumour of the neck. During the dissection, a large vein emptying into the internal jugular was divided so close to the latter that two ligatures were thrown around it above and below the opening on account of the very profuse hemorrhage. The man made a good recovery, and had not a single untoward symptom. The threads came away on the tenth day.

CASE XXXVIII.—Mr. O'Shaughnessy removed a large tumour of the right side of the neck together with a portion of the internal jugular vein, which was firmly adherent to it. Two ligatures were applied. The man recovered, and the vein did not bleed until the effects of chloroform had passed away.

CASE XXXIX.—MM. Marcé and Monnier applied two ligatures to the internal jugular vein which had been nearly divided in a suicidal attempt. One ligature came away on the sixteenth day, and the other was remaining in the wound, which had completely cicatrized on the thirty-third day. Recovery.

CASE XL.—Dr. John Watson, of New York, tied with separate threads the left internal jugular vein and primitive carotid artery of a woman who had been stabbed in the neck and who had lost much blood, but without arresting the arterial hemorrhage. Death ensued from softening of the brain at the expiration of fifty-seven hours, when the ligatures were seen to be in position, and the hemorrhage was found to have proceeded from the vertebral artery, which was nearly divided about half an inch above its origin.

CASE XLI.—Dr. Zeis, of Dresden, tied the *left* common carotid for nævus in an infant *fifteen months* old. On opening the sheath and exposing the internal jugular vein there was a gush of venous blood, which was stopped by creasote water. "The vein which had been tied swelled so much as to excite fear of its bursting, and was therefore tied again higher up, after which the artery was tied with a silk thread." The tumour immediately became swollen and shrivelled up; after seventy-two days the wound had healed. On the fourth day the ligatures came away from the vein, followed in twenty-four hours by venous bleeding, which recurred six times in the course of the next twenty-four hours, but each time was arrested by creasote water. "About a week before the complete healing of the wound, the child was attacked suddenly with convulsions and *hemiplegia of the right side*; these symptoms continued with increasing activity, and on the forty-ninth day after the attack of convulsions, the child died." No examination was allowed.

TABLE II.—Cases of Ligation of the Jugular Vein alone.

Case.	Operator.	Authority.	Mode of ligation.	Cause.	Result and cause of death.	Observations.
1	Simson, 1747	Med. Essays and Observations, vol. 5, Part I, 3d ed., p. 335. Edinburgh, 1747	One thread distal side	Removal of tumour	Recovery	First recorded case. Ligation cut away on the eighth day.
2	Simmons, 1791	A Treatise on the Diseases of Arteries and Veins. By Joseph Hodgson. p. 535. London, 1815	Three ligatures	Removal of tumour	Recovery	
3	Richter, 1797	Anfangsgründe der Wundarzneikunst. Band 4, p. 173. Göttingen, 1797	....	Wound of neck	Recovery	
4	Wattmann, 1823	Cornack's Monthly Journal of Med. Science, 1814, p. 753	Lateral	Removal of tumour	Recovery	Longitudinal opening to the extent of two and a half lines. <i>Air was aspirated</i> , followed by immediate syncope; recovery gradual; paralysis of left extremities for several days. Ligation came away on the twelfth day.
5	Stevens, 1820	Cooper's Surgical Dictionary, Am. ed. Supplement, p. 165. New York, 1842	Two threads	Removal of tumour	Recovery	The threads came away on the fourteenth day.
6	Smith, 1831	Baltimore Med. and Surg. Journal, July, 1831	One thread cardiac side	Removal of tumour	Death from exhaustion	No signs of phlebitis. <i>Air had entered the heart</i> , and the patient fell back insensible. Sucking noise heard
7	Morgan, 1836	Am. Journ. Med. Sciences, vol. xviii. p. 339. 1836	Two threads	Cut-throat	Recovery	The vein was more than one-half divided, and the loss of blood was profuse. The upper ligature came off on the eighth day, the lower on the tenth day.
8	Mirault, 1837	Compendium de Chirurgie Pratique, vol. i. p. 80. Paris, 1840	One thread cardiac side	Removal of tumour	Death in 3 hours from introduction of air	Ligation was applied to prevent <i>further aspiration of air</i> . Whizzing noise heard and tetanic spasms. Recovery from effects of air in eight minutes; but death from asphyxia.
9	Asmus, 1842	American Journ. Med. Sci., Jan. 1843, p. 229.	Two threads	Removal of tumour	Recovery	<i>Air was aspirated</i> . Syncope, convulsions, violent opisthotonos. Recovery from effects of air not complete until fourteen hours had elapsed.
10	Erichsen, 1844	Edinburgh Med. and Surg. Journal, p. 19. January, 1844	Two threads	Cut-throat	Recovery	Air entered the divided vein when it was raised to tie it.
11	O'Shaughnessy, 1845	London Lancet, June 23, 1849, p. 661	Two threads	Removal of tumour	Recovery	Portion of vein excised with tumour. <i>No bleeding until effects of chloroform were passing away.</i>
12	V. Moit, 1848	Transactions of New York Academy of Medicine, vol. i. p. 90. 1857	Two threads	Removal of tumour	Recovery	About three inches of the vein were imbedded in and removed with the tumour.
13	Brodie, 1849	London Medical Gazette, vol. ix. n. s. p. 296. 1849	Two threads	Removal of tumour	Recovery	<i>Air aspirated</i> . Sudden syncope, and patient thought to be dead.
14	Marcé & Monnier, 1851	Revue Méd.-Chir. de Paris, vol. xvi. 1854, p. 215	Two threads	Cut-throat	Recovery	Vein nearly divided. One thread came away on the 16th day; the other remaining on 33d day, when wound nearly healed.
15	A. B. Mott, 1855	Am. Med. Monthly, Nov. 1856, p. 326	Two threads	Cut-throat	Recovery	A portion of the vein had been cut out and the man was nearly dead when seen. Two threads came away on the twelfth and thirteenth days.
16	Maisonneuve, 1855	Gaz. Médicale de Paris, p. 492. 1855	One thread distal side	Removal of tumour	Recovery	

TABLE II.—Cases of Ligation of the Jugular Vein alone. (Continued.)

Case.	Operator.	Authority.	Mode of ligation.	Cause.	Result and cause of death.	Observations.
17-18	Sédillot, 1855	Traité de Médecine opératoire, p. 193. Paris, 1855.	Two threads	Removal of tumours	Recovery	Portion of veins excised with the tumours.
19	Widmer, 1856	Vegetans Operative Surgery, 4th Am. ed., Vol. I, p. 561. New York, 1856.	....	....	Recovery	
20	Gély, 1859	Traité d'Anatomie Chirurgicale et de Chirurgie Expérimentale. Par J. F. Malgaigne. Vol. I, p. 312. Paris, 1859.	....	....	Recovery	
21	Sanson, 1859	Malgaigne, ut supra, p. 342	One thread (lateral)	....	Death from hemorrhage	
22-23-24	Roux, 1859	Malgaigne, ut supra, p. 313	Lateral	Removal of tumours	Death from secondary hemorrhage	Ligatures came away towards the sixteenth day.
25	Laugenebeck, 1859	Archiv für Klinische Chirurgie, Band I, p. 69. Berlin, 1859	Two threads	Removal of tumour	Death from pneumonia 24th day	Portion of vein removed with tumour. Threads came away by slight traction on the twenty-third day. No post-mortem inflammation; but symptoms of purulent infection during life. Some oedema of the face.
26	Bégin, 1863	Leçons de Chirurgie d'Arnould, p. 429. Paris, 1863	Lateral	Removal of tumour	Recovery	
27	Neudorfer, 1866	Verbal communication to the author	Two threads	Removal of tumour	Death from exhaustion	Vein had undergone no change whatever, so that the ligatures had nothing to do with the fatal issue.
28	Schub, 1866	Dr. Neudorfer	Two threads	Removal of tumour	Death from exhaustion	Cause of death not connected with ligatures.
29	S. D. Gross, 1866	Unpublished case witnessed by author	Two threads	Removal of tumour	Recovery	Threads came away on tenth day. Not a single bad symptom.

TABLE III.—Cases of Ligation of the Internal Jugular Vein and Carotid Artery.

Operator.	Authority.	Mode of ligation.	Causes.	Artery ligated.	Result.	Observations and post-mortem appearances.
1	V. Mott, 1852	Am. Jour. Med. Sci., vol. xlii, p. 121. 1853	Removal of tumour	Ext. carotid	Recovery	Ext. jugular also tied. No cerebral disturbance.
2	Barcero, 1855	Edinburgh Med. and Surg. Jour., vol. xliii, p. 184. 1855	One ligature including artery	Com. carotid	Death on 60th day from gastric and peritonitis	Immediate signs of cerebral trouble; giddiness, spectral delirium, and pulsary left side of mouth and left hand. Continued for ten days. On 60th day symptoms of gastric fever, became peritonitis, with loss of sensation; sores, and death in 9 days. Upon inspection the brain and its vessels were found in a state similar to that of chronic inflammation; and the anterior part of the right lobe was covered by a fluid similar to a puriform exhalation. Left vessels tied. No cerebral disturbance.
3	J. Pancoast, 1855	Verbal communication to the author	Extraction of parotid gland	Internal carotid	Recovery	

Case.	Operator.	Authority.	Mode of ligation.	Causes.	Artery ligated.	Result.	Observations and post-mortem appearances.	
							The artery had been nearly divided at time of suicidal attempt. "The internal jugular was found perished, and without a mark indicating where the ligature had been applied."	
4	Guthrie, 1830	Diseases and Injuries of the Arteries, p. 328. London, 1830	Lateral ligature	Cut-throat	Com. carotid on 8th day	Death from exhaustion the result of arterial hemorrhage	Pneumogastric nerve divided. Ext. jugular also tied. Cure complete in six weeks, with some nervous and hemorrhagic accidents.	
5	Lalbat, 1844	Mémoires de l'Académie Royale de Médecine, vol. xvi. p. 360. Paris, 1852	One ligature	Removal of tumour	Com. carotid	Recovery		
6	A French surgeon mentioned by Giraud, 1850	Gibson's Surgery, 8th ed., vol. i. p. 290. Phila., 1850	One ligature including artery	Gunshot wound	Com. carotid	Uncertain; but did well up to 6th day. No fur, fist		
7	Langenbeck, 1859	Archiv für Klinische Chirurgie, Band i. p. 73. Berlin, 1860	One ligature cardiac side	Removal of tumour	Com. carotid 2 ligatures & division bet. them	Death from bronchitis on 12th day	Intellectual faculties unimpaired, and no signs indicative of obstruction to cerebral circulation. Vein completely healed without trace of clot, redness, or thickening of its walls. Old pleural adhesions. Bronchial tubes filled with mucus; lungs edematous, and at apex of right lung old tubercular deposits. Vessels of dura mater and surface of brain slightly injected; a little serum effused at base of skull. Other organs normal. Firm clot in the carotid.	
8	Langenbeck, 1859	Ibid., p. 77	One ligature cardiac side	Removal of tumour	Com. carotid 2 ligatures & division bet. them	Death in 48 hours. Man gradually sank	Temperature of both sides of head and neck the same. Intellect and special senses unimpaired. An accurate examination of the ligated vessels showed nothing to account for the fatal result. There was marked oedema of the lungs, and the bronchial tubes contained some mucus. The brain and other organs were normal.	
9	Gibson, 1852	Am. Journ. Med. Sci., vol. xlii. p. 365. 1853	Two ligatures and division bet. them	Removal of tumour	Common carotid, one thread, as a precaution against hem.	Recovery	Ligatures pulled from vein on the 33d day. Ligature came away from carotid five days later. The descending noni nerve was in the way and was divided. No cerebral disturbance.	
10	J. C. Warren, 1857	Surgical Observations on Tumours. Boston, 1857. p. 177	Two ligatures	Removal of tumour	Com. carotid one thread	Recovery	A portion of the vein left in the tumour. The vessels of right side had been ligated. Following morning some delirium. Temperature of right side of head lower than the opposite. Left pulse very feeble. Great difficulty in moving left arm and leg, but not exactly paralysis.	
11	Watson, 1853	New York Journal of Medicine, July, 1857. p. 49	One thread	Stab in the neck	Left common carotid one thread	Death from acute softening of the brain	operation on evening of 5th of October. In 48 hours somnolency, bordering on coma, followed in 4 hours by hemiplegia of right side, and strabismus. Death at 1 o'clock, morning of 8th. Ligatures in position on artery and vein. The hemorrhage which had defied the carotid ligation was found to have proceeded from the vertebral artery which was nearly divided about one half an inch above its origin. "The substance of the brain appeared in places, to have been somewhat softened. The pleura of both sides was found in flamed, and contained a considerable amount of sero-purulent fluid."	
12	Zeis, 1817	Chelius's System of Surgery, vol. ii. p. 508. Phila., 1817	Two threads	Ligation of carotid for vascular aneurys	Left common carotid, one thread	Death on 11th day from softening of brain	Ligatures came away on 4th day, and on following night considerable venous bleeding recurring 6 times in next 24 hours, but arrested by creosote water. Wound had healed in 72 days, but about a week previously child was attacked with convulsions and hemiplegia of right side. These symptoms continued with increasing debility, and on the 11th day after the attack of convulsions the child died. No post-mortem examination was allowed.	

Simultaneous Ligation of the Carotid Artery and Internal Jugular Vein.—There are some points in connection with the third table which demand separate examination, as it has happened in twelve cases of removal of tumours and wounds of the neck, that not only the vein, but also the common carotid artery, or one of its branches, has required the ligature. It has been supposed that, when such an event occurs, the dangers to be apprehended from the disturbance to the cerebral circulation are so much enhanced as greatly to invalidate the chances of success, and that gangrene, as evinced by softening of the brain, would ensue. This precept has been inculcated as strenuously as that of mortification of the lower extremity following obliteration of its main arterial and venous trunks. Professor Velpeau, in his remarks on the operation of tying the carotid, says:—

“If, unfortunately, the internal jugular vein should happen to be opened, I do not know whether it would be better to tie it, or to stop the hemorrhage by tents. But to say nothing of phlebitis, which, in this case—ligation—is the most formidable consequence to apprehend, who would not hesitate in obliterating so large a vein, at the same time with the principal artery of the head?” (*Op. cit.*, vol. i. p. 869.)

Professor Gross uses the following language in regard to the treatment of carotid aneurism by compression:—

“It cannot be brought into play here, the parts being intolerant of the requisite manipulation, to say nothing of the obstruction which it would occasion to the return of blood in the internal jugular vein, which, being dammed up in the brain and sinuses of the dura mater, might speedily induce apoplexy, or other serious cerebral symptoms, endangering the patient's life.” (*Op. cit.*, 4th ed., vol. i. p. 717.)

When the carotid artery alone is tied, it is obvious that there is less blood sent to the head than in the normal condition, and that, as a consequence, there will be capillary cerebral anæmia until the anastomotic circulation is fully established. This disturbance of the cerebral circulation is often followed by immediate or remote symptoms of functional or organic lesions of the brain, and of the latter, atrophic softening from deficient arterial supply, or acute or chronic inflammatory softening are the most common pathological states.

Brain trouble, according to Mr. Erichsen (*op. cit.*, p. 633), as indicated by immediate or remote symptoms, has been present in about one-fifth of the cases, one-half of which were fatal. Dr. Ehrmann's statistics show that 42 instances of cerebral disturbance of some kind ensued from ligation of one carotid in 184 cases, the percentage being about 22.

If the internal jugular vein of one side be tied, or the return of blood be interfered with by compression, congestion of the brain may ensue. The case of Dr. Heineken goes to show that the blocking up of the blood may produce death by coma; but the ligature has entailed no such result. Indeed, in the twenty-nine cases in which the vein alone was tied, that of Dr. Wattmann alone presented any symptoms referable to some lesion of the brain.

The vein of the *right* side was tied *laterally*, and after the patient had revived from the effects of the introduction of air, there was hemiplegia of the *left* upper and lower extremities. "After twenty-four hours, pain was felt in the paralyzed limbs, which seemed to be a forerunner of spasmodic contractions. These lasted for three days, diminishing in strength daily, and after they had disappeared, the sensation and voluntary movements of both limbs were as perfect as formerly." It is useless to try to explain these disorders by the ligature, as the cavity of the vein was not obliterated, so that there was no impediment to the return of venous blood; but the paralysis and hyperæsthesia must be referred to some lesion of the brain itself. It is thus seen that neither apoplexy, nor softening of the brain, nor even functional disturbance can be ascribed to tying one vein.

The preceding remarks have been called forth as introductory to a statement made by Professor Langenbeck, at page 51 of his paper, to the effect that "when both artery and vein are tied, not only does gangrene not follow, but there is less disturbance to the capillary circulation than when the vein or artery alone is tied. In two cases of ligation of the common carotid and internal jugular vein, we have observed no phenomena indicative of obstruction to the cerebral circulation. The intellectual faculties were unimpaired, and there was no weakness or paralysis of the limbs."

The above statement is true of Professor Langenbeck's own cases; but from an examination of those contained in the third table it is obvious that a more extended record does not confirm his positive assertions. Of the twelve cases two are to be excluded: that of M. Labat, who dismisses it himself with the remark that the case recovered with some nervous and hemorrhagic accidents; and that reported by M. Giraud, as no result is given. Ten cases thus remain for investigation. Of these, six, namely, the two of Langenbeck, those of Mott, Pancoast, Gibson, and Guthrie, were unattended either by immediate or remote signs of functional or organic disturbance of the brain; whilst that of Dr. Watson terminated fatally from acute cerebral softening, as seen upon post-mortem inspection; that of Dr. Zeis, at a very remote period, from chronic disorder, and that of Dr. Barovero from chronic inflammation. In the case of Professor Warren, in which the vessels of the *right* side were tied, there was some functional disturbance, as shown by "great difficulty in moving the *left* arm and leg;" but the condition was not exactly that of paralysis. In the case of Dr. Zeis, the *left* vessels were tied. On the 65th day the infant was attacked with convulsions and *hemiplegia of the right side*. These symptoms continued with increasing debility until the 49th day after the attack of convulsions, when the child died; but no examination was allowed. Dr. Watson tied the *left* vessels in his case. In 48 hours there was somnolency bordering on coma, followed in four hours by *hemiplegia of the right side* and strabismus, in which condition the man died 57 hours after the operation. Dr. Barovero tied the vessels of the *left* side with one thread, and the operation was succeeded

by immediate signs of cerebral trouble, as giddiness, spectral delirium and palsy of the left side of the mouth and of the left hand. These phenomena continued for ten days. On the 60th day there were symptoms of gastric fever, which soon became pernicious, with loss of sensation, sopor, and death in nine days. The dissection showed evidences of chronic inflammation. *From these data it thus appears that signs of cerebral disturbance followed ligation of the common carotid artery and internal jugular vein in 40 per cent. of the cases, of which 75 per cent. proved fatal; death having ensued in one case from acute softening, in one from chronic softening, and in one from chronic inflammation. The statement of Professor Langenbeck, which was based upon a too limited experience, that "gangrene is not to be feared," must, therefore, be rejected.*

The question naturally arises, How are these phenomena to be accounted for? I am myself at a loss to explain them. It has been seen, on the one hand, that these symptoms are not produced when the vein alone is tied, and, on the other, that they frequently follow ligation of the artery. I am disposed to refer them solely to the sudden interruption of the arterial circulation; and I do not deny the statement of Professor Langenbeck that "an equilibrium is maintained between the arteries and veins until the collateral circulation has been established." I only differ from him in regard to the occurrence of softening of the brain. Indeed, in the case of Dr. Heineken, the plugging may have obstructed the internal carotid artery, and thus have given rise to the fatal coma. Professor Langenbeck's deductions seem *a priori* to be reasonable; and it is very certain that gangrene does not always follow simultaneous ligation of the principal artery and vein of an extremity. I have collected many cases of this procedure, and, as I have stated in the preceding part of this essay, the operation was very common in the latter part of the last century, and was even practised by Mr. Hunter himself, without the production of mortification. That gangrene is not only not an inevitable result, but is rarely to be looked for, is well shown by the cases of Professor Grillo, of Naples, who included the femoral artery and vein in the same ligature in fifteen cases of aneurism of the ham or lower part of the thigh. These were all successful; while in fourteen other cases, in which the artery was isolated and alone tied, there were two deaths from secondary hemorrhage.¹

It would appear that in two of the cases of Table III. both vessels were included in the same thread, a procedure which should not be imitated, as death might result from secondary hemorrhage. In such a case, the vein being interposed between the ligature and the artery, the thread would act mediately upon the coats of the latter vessel, and not produce the desired effects.

Remarks on the Ligature.—The merit of having first applied a thread

¹ Gazette Médicale de Paris, p. 539. 1834.

to the internal jugular vein is due to Dr. Simson, of Scotland, the procedure having been employed at least forty times since the publication of his case.

The *effects* of the thread, as seen upon the human subject, are mentioned in the cases of Mr. Guthrie and Dr. Langenbeck, which illustrate the healing process after the application of each form of ligature. In the case of the former a lateral ligature was used, and on the ninth day the internal jugular vein was found pervious, without any mark indicating where it had been applied. In that of the latter, in which the vessel was completely surrounded by the thread, the inspection on the twelfth day showed the "vein completely healed, without trace of clot, redness, or thickening of its walls."

The *date of separation* is noted in eleven cases, and refers to seventeen ligatures. The shortest time was four days, the longest twenty-three days; the average thirteen days. One thread was cut away on the eighth day; two were pulled away on the thirty-third day; and one was remaining at the same date.

Substance and Number.—As metallic ligatures are not mentioned, it is assumed that silk or flax was employed in all the cases. In regard to the number, it is found to have varied from one to three. Of the thirty-seven cases in which the mode of application is mentioned, seventeen were single, nineteen double, and one treble. Of the single threads, six were lateral; two were applied to the upper end, and four to the lower end; in two cases the same thread included the common carotid artery; and the site of the remainder is uncertain. Of the double ligatures only three were peculiar: in one instance there was intermediate division of the vessel, and in two cases the threads were applied above and below the orifice of a divided vein emptying into the internal jugular.

Secondary hemorrhage occurred in five cases, affording a percentage of 12.2, of which 80 per cent. were fatal from the use of the lateral ligature.

The *mortality* after ligation of the internal jugular vein, as based upon forty cases in which the result is known, is but 12.5 per cent.; or, if the fatal case of pyæmia be rejected as due to the ligature, the mortality is reduced to 10 per cent.

It is to be remarked that in the cases of Sédillot, Mott, O'Shaughnessy, Warren, and Langenbeck, portions of the vein were excised with morbid growths; in one instance to the extent of about three inches.

Bad Effects from Ligation.—The evil consequences which have been assumed as resulting from obstruction of the internal jugular are entirely unfounded. An inspection of the twenty-nine cases of Table No. II. shows that capillary venous congestion, serous effusion, gangrene, and apoplexy have not resulted in a single instance. In the case of Dr. Wattmann, in which a lateral ligature was applied, and which consequently did not interfere with the return of blood from the brain, there was hemiplegia of the opposite side for several days; a phenomenon which I have already

endeavoured to explain by some coexisting lesion of the brain. In only one instance of the entire forty-one cases, that of Langenbeck, Case 25, Table No. II., was there any œdema. This was slight, and was confined to the corresponding side of the face;¹ and I am, therefore, inclined to believe that those authors who fear œdematous swelling on the distal side of the ligature, have applied the experiments of Lower on the dog to the human subject. Nearly two hundred years ago, Lower tied both jugulars of a dog, an operation from which death resulted in forty-eight hours. The areolar tissue of the head and neck was enormously distended with serous effusion.² According to Morgagni,³ the experiments of Galen, Emmettus, L'Amur, and Novesius showed no disturbance of the cerebral functions after ligation of the internal and external jugular veins; and no mention whatever is made of œdema. It may, therefore, be concluded that when one jugular vein is obstructed by the ligature, the free collateral circulation always prevents cerebral disorders, and that the occurrence of œdema is the exception to the general rule.

General Results of all Cases of Injuries and Operations in which the Internal Jugular Vein was wounded.—One case is excluded from the last table, as its termination is unknown; so that there are 85 instances, with 37 deaths, or a mortality of 43.52 per cent. The causes of death were in the following proportions:—

	Cases.	Per cent. of all cases.	Per cent. of all deaths.
Secondary hemorrhage	10	11.76	27.02
Pyæmia	6	7.05	16.21
Primary hemorrhage	4	4.70	10.81
Introduction of air	4	4.70	10.81
Exhaustion	6	7.05	16.21
Cerebral disorders	6	7.05	16.21
Epilepsy	1	1.17	2.70

General Results of No Treatment.—20 cases; all fatal, or a mortality of 100 per cent.:—

	Cases.	Per cent.
Introduction of air	4	20
Primary hemorrhage	4	20
Pyæmia	5	25
Secondary hemorrhage	5	25
Epilepsy	1	5
Softening of the brain	1	5

General Results where Compression was employed.—16 cases; 2 deaths, or a mortality of 12.5 per cent.:—

	Cases.	Per cent.
Secondary hemorrhage	1	6.25
Apoplexy	1	6.25

¹ See Langenbeck's paper, p. 50.

² Tractatus de Corde, etc., p. 123 et seq. 1669.

³ Cooke's Morgagni, vol. ii. p. 567 et seq. Boston, 1824.

General Results of Cases in which the Ligature was employed.—40 cases; 15 deaths, or a mortality of 37.5 per cent.:—

	Cases.	Per cent.
Exhaustion	6	15
Secondary hemorrhage	4	10
Chronic softening of brain	2	5
Acute softening of brain	1	2.5
Bronchitis	1	2.5
Pyæmia	1	2.5

In arriving at the preceding general results, it is distinctly to be borne in mind that the injury of the vein was in but few cases uncomplicated by other injuries. Of the 85 cases, the vessel was injured 37 times in the removal of tumours; 16 times by stabs; 12 times by gunshot injuries; 8 times by suicidal wounds; 3 times by accidental wounds; 7 times by other wounds, the nature of which is uncertain; and twice in ligating the common carotid artery. The true results of wounds of the internal jugular vein may, then, thus be stated, premising that the ligature was the cause of a fatal result in but four cases: Mortality of cases not subjected to treatment, or in which the treatment is not stated, 100 per cent.; mortality of cases subjected to compression, 12.5 per cent.; mortality of cases in which the deaths are referable to the ligature, 10 per cent.

General Conclusions.—From all the data contained in this paper, I have arrived at the following conclusions in regard to wounds of the internal jugular vein:—

First. That incised and punctured wounds of the internal jugular vein are to be classed among the most fatal of accidents; and, if subjected to no treatment, are invariably mortal from primary hemorrhage, the introduction of air, pyæmia, or secondary hemorrhage.

Secondly. That gunshot wounds of the vein alone are always fatal from primary or secondary hemorrhage, or pyæmia.

Thirdly. That when the carotid artery is opened at the same time, either as a result of gunshot, incised, or punctured wound, the case may, under favourable circumstances, recover, but with the formation of an arterio-venous aneurism.

Fourthly. That compression is followed by a fatal result as often as ligation; is more painful and inconvenient, and is to be resorted to in those cases only in which a thread is inapplicable from the high situation of the wound, or when the vein is merely punctured, and the measure can be applied mediately.

Fifthly. That ligation is more convenient, produces neither pain nor a suppurating cavity; and, that the fears of exciting diffused phlebitis are utterly groundless, as there is not a single example showing that such an inflammation has followed its employment. The ligature is, moreover,

called for to guard against the introduction of air and prevent its further ingress, as well as to prevent the occurrence of diffused phlebitis.

Sixthly. That the lateral ligature is to be avoided, as it has been the cause of all the fatal results from secondary hemorrhage; and that both ends of the wounded or divided vessel are to be tied, since reflux hemorrhage is not an infrequent occurrence.

Seventhly. That ligation of the common carotid artery will not restrain the flow of blood from a wounded internal jugular vein, and is, therefore, to be rejected as a hemostatic measure.

Eighthly. That not only has the danger of pyæmia after ligation of the vein been greatly exaggerated, but that all the dangers are also hypothetical, as neither apoplexy, softening of the brain, nor other cerebral disorders have ensued from its employment, the collateral circulation being amply sufficient to prevent those accidents.

Ninthly. That the cause of death after ligation is not to be looked for in the production of pyæmia, as the fatal issue has, in every instance, been due to secondary hemorrhage, coming on about the time of the separation of the thread.

APPENDIX.—The value of these general conclusions is enhanced, and their truth verified, by several additional cases that I have collected since this paper went to press. The first two demonstrate the safety and efficacy of the ligature; that of Mr. Fleming, which has generally been overlooked, is interesting from the fact of its being the first recorded example of ligation of the common carotid artery in its continuity, after rupture of the artery itself. Its similarity to the case of Mr. Guthrie, Case 4, Table III., is very striking. In both, the artery was grazed and the vein was tied; and hemorrhage from the ruptured artery occurred on the eighth or ninth day.

CASE I.—On the 9th of October, 1803, a servant on board His Majesty's ship *Tonnant*, attempted to commit suicide. On examination of the wound, which bled profusely, it was found that the epio-thyroid membrane, the superior thyroid arteries, and the internal jugular vein had been divided, and that the outer and middle coats of the common carotid artery had been grazed. All the vessels were tied except the carotid. The ligature from the vein came away on the seventh day, the patient having progressed favourably, with the exception of a troublesome cough and some swelling of the neck, which interfered with deglutition. On the ninth day after the infliction of the wound, during a violent paroxysm of coughing, the artery gave way, and deluged the patient with blood. Mr. Fleming, although he had no precedent for the procedure, at once cut down upon the vessel below the original wound, and included it in a thread; which was removed by dissection eight days subsequently. The man was discharged well at the expiration of two months. (*Med. Chirurg. Review*, N. S., vol. vi., 1827, p. 167.)

CASE II.—Professor Greene, on the 19th of August, 1866, removed an enormous so-called bronchocele from a lady, forty-five years of age. The entire growth was covered with a network of fragile dilated veins, which poured out a fearful amount of blood on being divided. At one point the tumour adhered to the sheath of the carotid vessels; and while separating it, a gush of venous blood indicated the rupture of the internal jugular vein, which was tied at the com-

pletion of the operation. With the exception of some trouble in respiration and deglutition, the woman made an excellent recovery, the entire wound having cicatrized on the thirty-third day.¹

The correctness of the first conclusion, that incised and punctured wounds of the internal jugular vein, when subjected to no treatment, or in which the mode of treatment is not given, and for which the ligature has not been employed, are invariably fatal from primary hemorrhage, the introduction of air, pyæmia, or secondary hemorrhage, is, with the exception of the occurrence of pyæmia, attested by the following additional cases.

CASE I.—“Wattmann gives the details of a case of a woman found dead in bed, with several incised wounds in the neck, by two of which the internal jugular vein was opened at two places. It was evident from the extent of the hemorrhage and other circumstances, that the wounds had been inflicted during life; and Wattmann endeavours to prove that it was not a case of suicide.”²

CASE II.—Dr. Handyside reports a case of a gentleman who had cut his throat. The conjoined origin of the occipital and posterior auricular arteries, and the posterior facial vein on the left side had been divided, together with the internal and external jugular veins of the right side. A pound and a half of blood were lost. Air was found, on post-mortem inspection, in the internal jugular and thyroid veins, both venæ cavæ, and the veins of the liver, spleen, and kidneys. It was also contained in the left carotid, aorta, femoral, popliteal, and brachial arteries.³

CASE III.—Specimen 1521⁴⁵ in the Museum of Guy's Hospital shows the left internal jugular vein plugged with a coagulum. It was taken from a man, thirty years of age, who had attempted suicide, and in the act, the vein had been completely divided and the thyroid gland irregularly cut. Secondary hemorrhage caused the death of the patient on the sixth day after the injury.⁴

In addition to the nine cases of traumatic communication between the carotid artery and internal jugular vein, alluded to in the January number of this Journal, there is still another example of aneurismal varia, which is peculiar from the fact of the tumour disappearing on deep inspirations. These ten instances, therefore, comprise all that have been recorded of these varieties of aneurism. The name of the gentleman reporting the case is not mentioned.

A student, twenty-two years of age, was wounded in a duel on the 29th of March, 1832, the point of the rapier having entered the neck about one inch above the middle of the right clavicle, its direction being from above downward and towards the middle line. On removing the cravat, a tumour was seen to have sprung from beneath the sterno-cleido-mastoid muscle, and a few drops of blood issued from the small triangular wound. The swelling soon became as large as an infant's head; symptoms of suffocation supervened; the pupil was dilated; and the patient lost his consciousness. These symptoms were alleviated by the abstraction of twenty-four ounces of blood from the bend of the elbow, and cold compresses were applied over the tumour.

On the following morning there were marked pulsations, and a bruit, as if fluid was escaping from a small orifice. The cold applications were continued, and on the 17th of April the tumour was reduced to the volume of an egg. Eight

¹ New York Medical Record, Dec. 1, 1866, p. 441.

² Cormack's Monthly Journal Med. Sci., Sept. 1844, pp. 782-3.

³ Edinburgh Med. and Surg. Journal, vol. xlix. p. 209.

⁴ Catalogue of the Museum of Guy's Hospital, vol. i. London, 1863.

months subsequently the tumour was of the same size. The bruit was confined to the point of communication between the two vessels, and the pulsations were so much increased by recumbency on the affected side that sleep was impossible. During a deep inspiration the tumour entirely disappeared; it could neither be seen nor felt, and it returned very slowly. The gentleman's general health was excellent. (*Archives Générales*, 2d ser., vol. iv. p. 135, 1834, and *Allgemeine Medicinische Zeitung*, No. xxxiv., 1833.)

PHILADELPHIA, January, 1867.

ART. II.—*On Rupture of the Abdominal and Pelvic Viscera, especially the Bladder, and other Injuries of the same Organs, including those occasioned by Fire-arms, with an Account of Eleven Cases, illustrated with Practical Comments and Observations.* By JOHN A. LIDELL, A. M., M. D., Brevet Lieut.-Col. U. S. Volunteers, late Surg. U. S. Vols., in charge of Stanton U. S. Army General Hospital, Inspector Med. and Hospital Department Army of the Potomac, etc. etc.

THE organs contained in the cavity of the abdomen are much more liable to be bruised and torn by external violence, unaccompanied with external wound, than those inclosed within the thorax and the cranium, since the walls of the former are composed almost entirely of the soft tissues, while the walls of the latter are strengthened and supported by either an osseous framework or a bony case.

The abdominal organs which are liable to suffer laceration from external violence, without external wound, are 1st, the *liver*; 2d, the *spleen*; 3d, the *stomach*; 4th, the *intestines*; 5th, the *kidneys*; 6th, the *ureters*; 7th, the *bladder*; and 8th, *ovarian tumours*. In such cases death may be produced either by shock, or by hemorrhage, or by peritonitis, or by deep-seated abscesses of the connective tissue. Rupture of the liver and the spleen, each, generally proves fatal from hemorrhage, or from shock and hemorrhage combined. Rupture of the stomach usually destroys life from shock alone, or from shock together with traumatic peritonitis. Rupture of the intestines kills its subjects from extravasation of feces into the cavity of the peritoneum, and diffuse inflammation of that membrane. Rupture of the kidneys, ureters, and bladder, may terminate fatally, either by extravasation of urine into the peritoneal sac, and the peritoneal inflammation consequent thereon, or by extravasation of that liquid into the connective tissue, and the consecutive abscesses which are liable to be produced by that cause. Rupture of ovarian tumours generally destroys life by inducing peritonitis.

1. Lacerations of the liver or spleen are usually accompanied by the effects of severe shock to the system, together with those of internal hemorrhage.

The symptoms are coldness and pallor of the lips, gums, face, and the whole surface of the body; pulse small, frequent, and feeble; countenance pinched and anxious; respiration sighing; restlessness; vital powers greatly depressed, with pain located in the part injured, and perhaps dullness on percussion, from extravasated blood; symptoms that speedily terminate in the death of the subject. But rupture of the liver does not prove fatal in all cases. It is only, however, in the cases where the injury sustained by that organ is comparatively slight, that we can hope for a favourable result. When the laceration is extensive, death is always speedily produced by the shock and the hemorrhage.

The following case affords an example of a form of *hepatic rupture* which is sometimes met with. In it the peritoneal investment of the liver was not torn through, although the hepatic tissue was very extensively lacerated. Death appears to have been occasioned by the conjoined operation of shock and internal hemorrhage. The blood was extravasated, not into the peritoneal cavity, or the abdominal cavity, as it is sometimes called, but beneath the peritoneal covering or coat of the liver, and between that membrane and the bruised, torn, and bleeding parenchyma of the organ.

CASE I. Rupture of the liver in an adult occasioned by being run over by a beer-wagon; death thirty-six hours afterwards; autopsy.—A large, muscular, middle-aged man, a German, who drove a beer-wagon in New York for a living, in reaching forward to pick up a rein while his horses were in motion, lost his balance, and fell before the wheels of his wagon, one of which passed over his abdomen. He died thirty-six hours afterwards. His wife informed me that he was a hard drinker up to the time of his death, indulging in deep potations of beer and brandy. I did not see him before death.

Autopsy about eight hours post-mortem.—Cadaver rather fat; face, lips, gums, and surface generally, very pale; right side ecchymosed. After opening the cavity of the abdomen, and elevating the sternum, a singular appearance was observed on the convex surface of the liver. The peritoneum covering it was seen to be extensively separated from the organ, and raised up by blood effused beneath it, so as to look like a large, flattened, bluish-coloured cake, laid upon the convex surface of the right hepatic lobe. The peritoneum investing the liver was not lacerated, and did not exhibit any marks of inflammatory action. On cutting open the large, flat, cake-like mass, it was found to consist of a quantity of fluid and coagulated blood, exceeding *forty ounces* in volume, which had been effused beneath the peritoneum, and had dissected or separated it from the hepatic tissue to the extent already mentioned. On removing the coagulum, we found an extensive laceration of the convex portion of the great right hepatic lobe; the length of the rupture was about six inches, and its depth three inches; its direction was parallel to the long axis of the liver, that is, perpendicular to the median plane of the trunk; its edges were separated from each other to a considerable distance by coagulated blood.

The liver itself was considerably enlarged, and exhibited the fatty degeneration. Its consistence was somewhat softer, or less firm than natural. There were no traces of either old or recent pleurisy, or peritonitis. The heart was large. The internal organs generally were anæmic.

Comments.—It is a singular fact that, notwithstanding the great extent of the laceration of the hepatic tissue in this case, the peritoneum covering it remained unbroken. Mr. Pollock, however, has also mentioned a case in which the liver was extensively ruptured by the passage of the wheel of a heavily laden cart across the trunk, and, at the same time, the peritoneum was not lacerated. This patient was admitted to St. George's Hospital May 26th, 1847, and died two hours afterwards. The peritoneum covering the upper surface of the liver appeared slightly bruised. On cutting into the upper part of the right lobe, considerable laceration of the substance was found, though the peritoneum was entire, and no hemorrhage into the peritoneal cavity had occurred. (*Vide Holmes's System of Surgery*, vol. ii. p. 416.) But this case differs from the one just related in one important respect, viz., the amount of the sub-peritoneal extravasation of blood appears to have been small in the former, and very large in the latter case, and, therefore, was much less efficient as a cause of death in the case related by Mr. Pollock, than in that reported above by the writer.

Although the laceration of the hepatic tissue, and the unbroken condition of the peritoneal coat which accompanied it, constitute the most interesting feature of our case, still I think the fatty degeneration of said tissue should not be passed by as unworthy of our notice in this connection. The intra-cellular and interstitial deposition of fat, by diminishing the consistence of the hepatic tissue, and rendering it more friable, may promote the occurrence of rupture, and predispose, in one sense of the word, the liver to suffer that injury, on the application of violence. That is to say, the liver, after it has undergone the fatty degeneration in a marked degree, may be ruptured by an amount of violence which, provided the organ is in a normal state, would not have produced such a result.

But the fatty metamorphosis of the liver that was present in this case also interests the surgeon in this connection, on account of its relations to the habits of the deceased; for, to what other cause besides beer and spirit-drinking can it be referred? It was not produced by phthisis pulmonalis, for the man did not have it. Neither was it occasioned by a luxurious table diet, for he was a poor cartman, who supported his little family by daily labour. Nor have we any evidence that it was produced by intercurrent disease in any form, for he usually enjoyed good health, until he was suddenly stricken down by violence. I therefore think we can safely assume that it was occasioned by his habit of drinking beer and spirits to excess. Furthermore, pathological research has shown that in almost all instances the livers of the intemperate have undergone the fatty metamorphosis to a greater or less extent.

With regard to the *treatment* of rupture of the liver, the surgeon must be guided by the symptoms, since no specific plan can be laid down for his direction. The indications are to limit the extravasation of blood from the lacerated organ, and to prevent or subdue inflammation of the hepatic

tissue and peritoneum. For the accomplishment of the first indication absolute rest, in the recumbent posture, must be insisted upon as a *sine quâ non*. *The patient must not even be permitted to raise himself, or to be raised in bed*, if his appearance and condition indicate that much blood has escaped from the injured organ. For, under such circumstances, though the patient may appear to be doing well, death may be produced by very slight exertion.¹ Opium should be administered, with a view to quiet the nervous system, to allay the local pain, and to moderate the inflammatory process, especially in the peritoneum. In cases where there is much pain and tenderness under pressure, it may be advisable to abstract blood with leeches, if the state of the pulse will allow depletion. Fomentations of the abdomen also not unfrequently afford the patient much relief from the pain and distress which are produced by rupture of the liver. But, as we have already stated, the treatment must, in the main, be guided by the symptoms, and be adapted to their relief.

Gunshot wounds of the liver bear considerable resemblance to the lacerated wounds of the organ of which we have just been speaking, for gunshot wounds in general are essentially lacerated as well as contused in character, and hence we may with propriety devote a few words to them in this place. But gunshot wounds involving the hepatic tissue are always complicated with traumatic lesion of other important structures, such as the peritoneum, walls of the abdomen, etc., whereby the severity of the injury is proportionally increased, and the chances of recovery proportionally diminished. We are not surprised, then, to find that gunshot wounds of the liver are attended with a very large mortality. Dr. Otis states, in Circular No. 6, dated War Department, Surgeon-General's Office, Nov. 1st, 1865, that of 32 cases of this form of injury, in which the diagnosis was unquestionable, all but 4 terminated fatally. (*Op. cit.*, p. 26.) The ratio of mortality thus afforded is 87.5 per cent. The same writer also says that gunshot wounds of the liver were usually followed by extravasation into the abdominal cavity, and rapidly fatal peritonitis. But the liver is one of the largest organs in the whole body, and hence is more liable to be injured by gunshot projectiles than such of the viscera as have a smaller size. Hence the liver is often wounded by the missiles of war; and thus it happens that while but a small proportion of those injured in this part recover, we still not unfrequently meet with successful cases. Thus, the writer has seen at least two patients having gunshot wounds of the liver that made good recoveries. Hennen has related two cases of recovery from gunshot wounds of the liver. (*Principles of Military Surgery*, pp. 340-343, Am. ed.) Guthrie has related five cases of the same

¹ A fatal result was expedited in this way, in a case of rupture of the liver, related by Mr. Pollock. This patient appeared to be gaining some strength, when he died suddenly, three days after the injury, on attempting to raise himself up to get upon the bed-pan. (Vide *Holmes's System of Surgery*, vol. ii. pp. 417, 418.)

form of injury which terminated in recovery. (*Commentaries on the Surgery of War*, pp. 529-532, Am. ed.)

The following case presents to us an example of gunshot wound of the liver.

CASE II. *Gunshot wound of the liver: convalescence already established when he passed out of view.*—Private Lyman T. Hunt, Company "G," 2d New York Cavalry, was wounded, according to his statement, and I know of no reason to doubt its correctness, in a cavalry skirmish connected with the pursuit of General Lee's army, April 6th, 1865, by a carbine ball (conical), which, as we found on examining him, passed through his right hypochondrium from before backwards, wounding the right lobe of the liver. He was left at a farm-house in the neighbourhood of the place where the wound was inflicted, until the 12th, when he was brought to Burke's R. R. Junction¹ in an ambulance, a distance of about fifteen miles, over roads that were rough and difficult of transit, from rut-holes and mud. My attention was not directed to him till the 15th. There was then a copious discharge from the posterior orifice of a yellowish-coloured liquid, which appeared to be bile. His general condition was by no means bad, and he was hopeful of recovery. His appetite was poor, but his abdomen was not swelled. There was no diffused tenderness nor pain in the belly. He said he had not suffered much pain at any time. He was thin in flesh and slightly jaundiced in colour.

On the 17th, the attendant being engaged in dressing the wounds at the time of my visit, I noticed that the anterior orifice was clean and granulating satisfactorily, and that the posterior orifice also was clean, except a small shred of slough which still hung in its centre. It also was granulating nicely. The orifice of exit was somewhat larger than that of entrance. He said his appetite was now somewhat better, and was also cheerful and hopeful.

April 19th. He was transferred to the Depot Field Hospital, at City Point, by railroad, doing well, thirteen days after the wound was inflicted.

Comments.—The result of this case is not known to the writer. Still, when we consider the length of time this patient was under observation after the injury was inflicted, and the fact that he was steadily improving, notwithstanding the disadvantages to him arising from rough ambulance transportation, etc., there seems to be but little doubt of his ultimate recovery.

The symptoms occasioned by gunshot wounds of the liver are those which belong to gunshot wounds in general, together with some that are produced by disturbance of the hepatic functions. Thus, Hennen says: "The usual symptoms which characterize these injuries are yellowness of the skin and urine, derangement of the stomach, and of the alimentary canal, and cutaneous affections, particularly great and distressing itching. The discharge from the wound is generally yellow and glutinous, but I have seen it of a serous nature, and sometimes very nearly allied to unmixed bile." (*Op. cit.*, pp. 339, 340.) In the case just related the patient

¹ Burke's R. R. Junction was then the base of the Army of the Potomac.

presented an icterode hue, the urine was dark coloured from the presence of bile, and the biliary secretion was distinctly seen flowing out of the posterior orifice of the gunshot wound. This biliary matter stained the charpie, compress, and bandage used in dressing the wound of a yellow colour.

Gunshot wounds of the liver tend to destroy life by the shock, the hemorrhage, and the consecutive peritonitis which they may occasion. One of Hennen's cases came nigh unto bleeding to death from the wound. The hemorrhage, which continued for three days from both orifices, was so excessive that the patient could not be moved from the neighbourhood of the field of battle. I do not doubt that gunshot wounds of the liver oftentimes occasion death by hemorrhage, or by shock and hemorrhage combined. Indeed, it is only in the less severe instances of this form of injury that we can expect recovery to take place. I believe that a considerable proportion of those wounded in the liver do not leave the field of battle alive. Such cases are apt to be returned under the head of those killed or mortally wounded in action on the company rolls. Gunshot wounds of the liver are much more likely to be followed by consecutive peritonitis of a troublesome character than simple laceration of that organ, since the same projectile which injures the liver injures the peritoneum, both parietal and visceral, to considerable extent also.

The treatment required by gunshot wounds of the liver is, in most respects, identical with that required by rupture of that organ; or, at least, it should always be conducted on the same general principles. Hennen and Guthrie placed their chief reliance on profuse bloodletting, repeated as often as necessary, purgation, and a low diet. Surgeons of the present day, however, consider the sanguinary method of treatment employed by our predecessors as highly improper. They believe that they obtain better results by abstaining from general bloodletting in most cases of wounds of the liver, and employing, instead thereof, opiates *p. r. n.*, local depletion with leeches or cups, epispastics, saline drinks, sufficient and bland or non-irritating alimentation, and quietude in the recumbent posture as nearly absolute as possible.

The clinical history of the following case affords a good illustration of the plan of treatment, which, in our experience, has proved to be satisfactory for the lesions of the hepatic tissue that are produced by fire-arms.

CASE III. *Gunshot wound of the liver; treatment—quietude, opiates, tonics, and a milk diet; recovery.*—Private Gilbert Smith, Co. "C," 126th N. Y. Vol., æt. eighteen, was admitted to the Stanton U. S. Army Gen. Hospital June 4th, 1864, for a gunshot wound of the abdomen, inflicted May 30th, in action at Hanover C. H., Va. The bullet penetrated the right hypochondrium about five inches from the median line, and at the inferior border of the thorax. It then passed downwards, backwards, and somewhat inwards, wounding the liver in its course, and escaped a little above the right ileum, about two inches from the middle line. When

admitted to hospital the patient complained of having much pain and soreness in the track of the wound, and in the neighbouring parts, and a thin viscid fluid, of a decidedly yellow colour, believed to be bile, was discharged in considerable quantity from the wound of entrance. Prescribed quietude in bed as nearly absolute as possible, water dressings for wound, anodynes to relieve distress, and a milk diet. He continued to be very restless, especially at night, and on the 6th he was ordered to take pil. opii (gr. j) every two hours until relieved: and after that the opiate was administered as often as necessary to procure relief from distress. No purgatives were given. The principal reliance was placed upon the opium treatment, assisted by quietude, cleanliness, and a diet consisting mainly of milk. His bowels did not move for about a fortnight, but this circumstance did not excite any apprehension in our minds, since he did not seem to suffer for the want of a motion. He became very much emaciated and debilitated, and it became necessary to administer besides opiates, stimulants (milk-punch) and tonics (tinct. ferri muriatric.). He obviously derived benefit from the use of these remedies.

July 8. He contracted scabies from a visitor, a comrade probably, which was treated successfully with ungt. sulphuris.

21st. He complained of having aching pains in his bones, which were most severe at night. Prescribed potass. iodid. gr. vj. tinct. cinchonæ f5ij, to be taken four times a day. This remedy afforded complete relief in a few days.

August 4. He had a slight attack of diarrhœa, which was promptly arrested by the use of the subnitrate of bismuth. During all this period of two months the wound did well. The orifice of exit became completely healed in the latter part of July, and about two weeks before that of entrance.

10th. The orifice of entrance also is now completely healed, and all discharge from the wound ceased. After this he improved rapidly in flesh and strength, and soon began to leave his bed.

Sept. 7. Patient doing very well, and going about on crutches. Both orifices of the wound have closed with good cicatrices.

8th. He left the hospital on a furlough for sixty days.

In the opinion of the writer, it is not by any means certain that the result of this case would have been equally fortunate, if the patient had been treated by venesection, purgation, and a low diet.

It may, with propriety, be stated in this place, that the writer has seen another case of gunshot wound of the liver, besides the foregoing, make a good recovery under precisely the same mode of treatment; and, furthermore, that he has never seen a case of traumatic lesion of the liver treated by the sanguinary and depletory method which was employed by our predecessors, nor one which seemed to justify the adoption of such a plan of treatment.

With regard to wounds of the gall-bladder, Hennen says he has never known a patient to recover from that lesion; and he also remarks, that it is difficult to imagine how such an injury could be inflicted without an effusion of bile into the abdominal cavity, except an adhesion to the abdominal parietes had previously occurred. (*Op. cit.*, p. 344.) Guthrie

also says: "Wounds of the gall-bladder are, as far as known, fatal." (*Op. cit.*, p. 529.)

2. In the next case we are presented with an instance of laceration of both the tissue of the *spleen* and its capsular investment, which occurred without any external cause that was apparent; wherefore said lesion is supposed to have been produced spontaneously, or by the operation of internal causes.

CASE IV. *Spontaneous rupture of the spleen occurring in a patient affected with typhus fever; sudden death from internal hemorrhage; autopsy.*—Sarah Kerr, æt. about 25, born in Ireland, was admitted to the Emigrants' Hospital, on Ward's Island, Nov. 30, 1849, and appeared to be suffering from the ordinary symptoms of "ship fever," in an early stage. She said she had been sick only two or three days. On the next day after admission to hospital (Dec. 1st), she appeared to be doing well, until 1 o'clock P. M., when she suddenly became pale, faint, nearly pulseless, with blanched countenance, and all the usual symptoms of sudden internal hemorrhage, and in one hour she died.

Autopsy sixty-six hours after death.—Embonpoint preserved. Cadaver very pale and waxy, as in death from hemorrhage. Cavity of peritoneum contains a large quantity of extravasated blood (say 90 oz.), of which the coagulated portion is large (nearly 40 oz. in volume), and tolerably firm. This blood has been effused from the spleen, which, on examination, is found to be ruptured. Its peritoneal coat is torn through. There is also a clot of blood beneath the peritoneal investment of the spleen, 8 oz. in volume, which has compressed and flattened that organ. The parenchyma of the spleen is softened and of a bright chocolate colour. The peritoneum is nowhere inflamed. The blood is mostly collected in the left iliac and splenic portions of the peritoneal cavity.

The rupture of the spleen could not be attributed to any injury. Careful inquiry concerning this point was made at the time it occurred.

Comments.—To what circumstances must the rupture of the spleen which occurred in this case be ascribed? They appear to be several in number, the *first* of which is the considerable degree of softening, which all the structures that enter into the composition of the organ, including the coats of its bloodvessels, had undergone; *second*, the intense congestion of the portal vein and its radicles, which not unfrequently accompanies the early stages of petechial typhus as well as malarial fevers; *third*, the giving way of the softened walls of certain bloodvessels because of the distension occasioned by the stagnating blood, on the surface of the organ, whereby blood was extravasated between the splenic tissue on one side, and the capsule and investing peritoneum on the other; *fourth*, the extravasated blood increasing constantly in quantity compressed the parenchyma of the organ on one side and dilated or expanded the capsule and the investing peritoneum on the other, until finally they burst, and then the blood was poured in great quantity into the peritoneal sac, and all the symptoms of profuse internal hemorrhage were suddenly developed, and speedily followed by the death of the subject. It is also possible that the patient had sustained some slight injury involving the spleen which she had

either not noticed at all, or had entirely forgotten, and which determined the particular portion of the spleen where the hemorrhage began.

With regard to the special diseases, in connection with which spontaneous rupture of the spleen has been met with, the writer can only say, that while he recollects of having read of cases of malarial fever, wherein, during the algide stage, rupture of that organ occurred, he cannot now call to mind any instance of petechial typhus attended with such a lesion of the spleen besides the one just related.

Sir James Y. Simpson has, however, recently called attention to the subject of *spontaneous rupture of the spleen occurring in females, in connection with child-bearing*. At a meeting of the Obstetrical Society of Edinburgh, in June last, he referred to three fatal cases of that lesion, which occurred respectively in the pregnant, parturient, and puerperal states. The cause of death in each case was effusion of blood from the ruptured organ. In one instance, the accident happened in connection with premature labour, about the sixth or seventh month. The lacerated organ was found enlarged. In another instance it occurred in the person of a woman delivered with forceps at term. She sank and died of internal hemorrhage within an hour or two after delivery. In the third instance, the rupture of the spleen occurred a week or two after delivery. The patient, after making some unusual muscular exertion, complained of abdominal pain and sinking, and died. The lesion above mentioned and extravasation of blood were found on dissection. The predisposing cause of the laceration of the spleen in these cases appears to have been the hypertrophy and softening of that organ which are sometimes occasioned by pregnancy. (*Vide Edinburgh Med. Journal*, Sept. 1866, and *American Journal of Medical Sciences*, Jan. 1867, p. 266.)

Again, *rupture of the spleen* has not unfrequently been produced by external violence without previous disease of that organ. Hennen says that blows upon the region of the spleen have often given occasion to fatal extravasations of blood, and sometimes this organ has been ruptured by blows inflicted at more distant points. (*Op. cit.*, p. 347.) The same writer relates a very interesting case in which the spleen was ruptured by a violent blow upon the stomach. It occurred in the person of a soldier in the course of a fight with a comrade. This soldier had been knocked down, and while in the act of rising, with the assistance of another man, he received a powerful blow on the stomach, which brought him again to the ground. Upon being placed upon his feet, he fell, as if he had fainted. He was immediately assisted to his quarters, being unable to walk without assistance, where he died in a few minutes, with all the usual symptoms of internal hemorrhage. On making an autopsy between six and seven pounds of blood were found in the peritoneal cavity. The spleen was found to be ruptured from its lower to its upper margin, that is, to the extent of four inches. The laceration extended under the duplicature of the peritoneum connecting the spleen with the stomach, close by the entrance of the

splenic artery, the large vein accompanying which was ruptured. The spleen was not diseased. The abdominal viscera generally were sound. The stomach was filled with liquid food. The occurrence took place soon after breakfast. (*Op. cit.*, pp. 348, 349.) Guthrie says: "Injuries of the spleen have usually been fatal, from hemorrhage filling the general cavity of the abdomen, especially when they have arisen from rupture of that organ, which I have several times seen occur, in consequence of falls, or blows from cannon-shot, which have not opened into the cavity nor exposed the viscus." (*Op. cit.*, p. 536.)

The fatality attending *gunshot wounds of the spleen* has been very great. It is stated in Circular No. 6 (p. 27), that all the cases of gunshot wounds of the spleen that have been reported during the late war were fatal. Hennen remarks: "Of wounds of the spleen I have seen a few; some of the slighter recovered, the deep invariably proved fatal." (*Op. cit.*, p. 347.) Guthrie, also speaking of the spleen, says: "Wounds from musket-balls have, for the most part, destroyed the sufferers either from hemorrhage or from inflammation. I have not seen nor heard, during the Peninsular war, of a wound in the abdomen, through which the spleen protruded, the patient recovering."

He further observes: "Wounds from stabs with a bayonet, or sabre, or long pointed sword are frequently fatal, either from hemorrhage or from inflammation; but I have seen, accidentally, after death, cicatrices in the spleen corresponding to external marks, indicative of a former wound." (*Op. cit.*, pp. 536, 537.)

The treatment of wounds of the spleen should be conducted on the same general principles as the corresponding lesions of the liver, and the reader is respectfully referred to the portion of this essay where they are described for an account thereof.

3. *Rupture or perforation of the stomach* produced by external violence, without external wound, when its coats are not diseased, is a very rare occurrence, unless other organs are broken or lacerated at the same time, and almost invariably proves fatal. In all such cases the amount of shock sustained by the system at large is likely to be very great, and always to expedite, or even, in most instances, to directly produce the fatal issue. This circumstance grows out of the important office discharged by the stomach in the organic economy, and the intimate relationship it holds with the great nerve-centres and the vital organs (so called), through reflex nervous action. In an instance of this lesion of the stomach, which is reported in the *London Medical Review* for July, 1860, death occurred in about eight hours. The writer has never seen an example of this form of injury occurring by itself, that is, unaccompanied by rupture of other important viscera.

Gunshot wounds of the stomach are also very dangerous to life, but at the same time do not always prove fatal. Several instances in which wounds made in different parts of this viscus by puncturing, cutting and

contusing instruments, and even by fire-arms, did not prove fatal, have been collected by Hevin (*Mémoires de l'Acad. Roy. de Chirurgie*, t. i. p. 590, including the foot-note marked *b*, et seq. Paris, 1761). But Ploucquet has collected a much larger number of examples belonging to the same category (*Literatura Medica Digesta*, etc., Art. Ventriculus and Pantophagus, 5 vols. 4to. Tübingæ, 1808—13.) Several cases in which recovery from this lesion took place, have been recorded by Hevin (*Mémoires de l'Acad. Roy. de Chirurgie*, t. i. p. 444), and referred to by Ploucquet (*Literatura Medica Digesta*, etc., Art. Ventriculus and Pantophagus). Hennen mentions two cases of traumatic lesion of the stomach with a successful termination, which occurred at the battle of Waterloo, and were reported by Dr. Thomson. In one of them, the injury was inflicted by a musket-ball, and in the other by a pike. In our own country, the well-known case of Alexis St. Martin has been reported by Dr. Beaumont. Dr. De Witt C. Peters, U. S. Army, has also reported a case that occurred during the late war.

Private George H. Bowers, 8th Illinois Cavalry, was wounded in a skirmish near South Mountain, Sept. 13th, 1862, by a musket-ball, which entered two inches above the umbilicus, an inch to the left of the linea alba, and escaped beneath the tenth rib, three inches to the left of the spinous process of the tenth dorsal vertebra. Immediately after he was shot, he vomited blood copiously until syncope supervened. Hematemesis recurred frequently for seven days, and blood was passed at stool. Liquids taken into the stomach, and likewise the chyme, escaped freely through the anterior wound, and this phenomenon, in less degree, continued for a period of two months. Acute peritonitis followed the infliction of the injury. It was treated with quietude, epispastics, and opium in large doses. He became much emaciated, but after some time the wound healed, and then he recovered his flesh and strength. By the following May, the digestive organs had resumed their normal action; but the body was bent forward by intra-abdominal adhesions. He was subsequently discharged from the service. (Vide *American Med. Times*, April 4th, 1863, and *Circular No 6*, *Surgeon-Gen. Office*, p. 25.)

Symptoms.—That a wound involves the stomach may sometimes be inferred from its situation and direction; but we cannot be sure that said viscus is penetrated by such wound, unless blood is vomited, or the contents of the stomach escape through the wound, or the solution in the continuity of the abdominal walls happens to be so extensive that the wound of the stomach can be seen by the surgeon.

Treatment.—Hennen says that Dr. Thomson's cases of wounds involving the stomach, which are mentioned above, were treated on the mild unirritating plan adopted for wounds of the intestines, and that, as he understands, both of them did well. The history of Dr. Peter's case gives us a good idea of the mode of treatment which should be employed for gunshot wounds of the stomach. Opium should be administered for the purpose of allaying pain and controlling peritoneal inflammation, and the patient's strength should be supported by such kinds of nutriment as

do not require gastric digestion, for example, strong beef-tea or other animal broths, sugar, emulsion of gum Arabic, well boiled porridge of farina, corn-starch, arrowroot, etc. In cases of incised wound of the stomach, it will be advisable to sew up said wound with the continuous suture, if the aperture in the abdominal walls is large enough to permit it to be done.

Dr. Peters has also related a case of punctured wound of the stomach, in the communication to the *American Med. Times* referred to above, which occurred in New Mexico. The injury was inflicted with a cheese-knife. The subject, a man, recovered in a short time, without surgical interference. This circumstance should teach us to avoid meddlesome interference, at least, in all similar cases.

4. The next case affords a good illustration of *rupture of the intestines* and its consequences.

CASE V. Rupture of the ileum occasioned by the kick of a woman ; death in twenty-two hours ; autopsy.—Thomas Clark, æt. about 50, and of intemperate habits, was taking improper liberties with a woman on the evening of August 16, whereupon she kicked him in the abdomen one or more times with her bare foot. After being kicked he immediately cried out with pain. Symptoms of peritonitis directly supervened, and he died August 17, about 7 o'clock P. M., twenty-two hours after the occurrence.

Autopsy twenty-four hours after death.—Cadaver in a decomposing condition. Scrotum emphysematous. Subcutaneous areolar tissue of neck also emphysematous. On opening the cavity of the peritoneum considerable gas escaped with a loud noise. This cavity contains a considerable quantity of bloody serum having flakes of lymph floating in it. The peritoneum is intensely inflamed through the greater part of its extent. It exhibits a dark-red colour, and extensive coating with recent plastic exudation. The stomach and intestines are distended with gas. The small intestines are agglutinated in places by recent adhesions. On continuing the examination, a rent or hole in the coats of the small intestine (*ileum*) was discovered in the left iliac region. This fissure was about three-quarters of an inch in length. Its long axis coincided with the long axis of the intestine. Its edges were not ragged, but sharp and well-defined. I did not discover any thickening of them nor any ulceration. In the neighbourhood of the rent the intestine was blackened by ecchymosis to the extent of several inches. The intestinal coats were also softened, but they were not very soft. There were no intestinal ulcerations. The mucous coat generally was reddened and softened. The omentum exhibited some chronic thickening in places which were smeared over with recent fibrinous exudation.

There was the sac of an old oblique inguinal hernia in the left groin. The gut was not down in the breach when I made the examination. I could introduce two of my fingers into the abdominal ring.

The rupture of the intestine gaped open and was therefore somewhat elliptical in shape. Through it the contents of the intestine had been poured into the peritoneal cavity. Through it the mucous coat protruded but did not suffice to plug it up. The inflammatory effusion in said cavity was very irritating. It caused much smarting pain in some slight abrasions upon my hands.

A physician was brought to the deceased soon after he was kicked, and

found him complaining of intense pain located principally in an old inguinal hernia of the left side. The gut was then down in the sac. He reduced the hernia, which afforded some relief from the pain. The hernial swelling was also tender. The patient continued to complain of severe abdominal pain, which was most intense in the left iliac region. The abdomen speedily became tender under pressure, constipation was present, vomiting supervened, with tympanitis and hiccough, he became collapsed, and he died twenty-two hours after the infliction of the injury.

The presumption is strong that he was kicked on the hernial tumour, the gut being in the sac at the time, and that the rupture of the intestine was produced in this way.

CASE VI. *Traumatic peritonitis produced by rupture of the small intestine (probably): death in twelve hours: autopsy.*—John McGlear, a young man æt. 17, ran against the tail of a cart that was standing in the street, and inflicted thereby a violent blow upon his abdomen, while hastening to reach a fire in the darkness, on the night of March 15. According to his statement, as I was informed, the cart struck his belly a little above and to the right of the umbilicus. I did not see him during life.

Autopsy twenty-nine hours after death.—Rigor-mortis strong. Abdomen tumid from gases in the cavity of the peritoneum. On opening said cavity they escaped with a loud noise. Large portions of the peritoneal coat of the intestines are injected with blood, red in colour, varying from scarlet to crimson, and present a velvety or very fine granular appearance. Other portions of both the visceral and parietal peritoneum are covered with a gray and soft coat of false membrane, and still other portions are invested with a thin layer of pus. The cavity of the peritoneum contains about half a gallon of yellowish frothy fluid, containing flakes of lymph and pus. The bladder is about half full of urine, and uninjured. The intestines are considerably and pretty uniformly distended with flatus. It is not easy to find the place of injury or rupture. There is no mark of bruise or ecchymosis in the walls of the belly; neither does it become apparent on superficial inspection of the intestines where the laceration has taken place. I passed the greater part of the intestines *in situ* through my fingers without finding the place of rupture. I was precluded from continuing the search by the circumstance that the coroner and his jury were impatiently waiting for my testimony at this time. I have little doubt, however, that some portion of the intestinal canal was ruptured, and that the diffuse peritonitis which killed the subject in twelve hours was produced thereby; and believe that I would have found the fissure if I had been permitted to continue the search for a sufficient length of time.

The *liver, spleen, and kidneys*, were normal.

Comments.—Rupture of the intestinal canal without external wound, but, at the same time, produced by external violence, is a form of injury that is often met with. It has been produced by falls upon the abdomen, by the kicks of horses or mules upon the same part of the body, by violent blows inflicted by other means, and by the application of a great amount of dead weight, as, for example, when the belly is run over by the wheel of a heavily laden cart or wagon. In the case last related the intestinal rupture was occasioned by striking the belly with great violence against the tail of a cart while running. In the case which precedes it, laceration

of the ileum was produced by the kick of a woman. I also recollect one instance in which this lesion of the small intestines was produced by being caught between the bumpers of two rail-road cars.

Symptoms.—Rupture of the intestinal canal from external violence, and without external wound, generally occasions the following phenomena: Abdominal pain, which is more intense at the seat of injury than elsewhere, and is much increased by pressure; respiration, superior thoracic and hurried; decubitus dorsal, and the legs are generally drawn up; tympanitis, with a tense, hard, and unyielding state of the abdominal muscles, not unlike that of a drum-head; pulse frequent, quick, small, and tending rapidly to become weak; countenance pinched and anxious; tongue usually coated (more or less); vomiting generally commences early and continues to the close; the matter thrown up consists at first of the remains of the last meal, next of a greenish-coloured liquid, and finally of a dark-coloured matter having a feculent odour. The bowels are obstinately constipated. The patient sinks rapidly into collapse, and generally dies after an interval which varies from eight or ten to thirty or forty hours in duration. Occasionally the patient survives the injury for three or four days. In some cases the shock occasioned by the injury is very great, and such patients commonly die early. In other cases the shock is but slight. In the former, the intestinal laceration is usually found to be extensive, on making an autopsy; in the latter it is commonly discovered to be but small. Thus we perceive that all the symptoms which are produced by rupture of the intestines, with the single exception of the primary shock, are occasioned either by the extravasation of the intestinal contents into the peritoneal sac, or by the diffuse inflammation of the peritoneum which immediately succeeds it.

On making a post-mortem examination of the injured intestine, the edges of the laceration are generally found to be everted, and the mucous membrane protruding, often plugging up the aperture when it is small. Sometimes it is difficult to find the place of rupture when it happens to be very minute and covered up by false membrane. Intestinal lacerations having a small size are, for the most part, the result of blows or kicks; and those having a large size, in some cases almost severing the wounded gut, are generally occasioned by the passage of heavy weights, such as the wheel of a loaded cart or wagon, over the subject's abdomen.

The *prognosis* in cases of intestinal rupture, with escape of feces into the peritoneal sac, is always very unfavourable. Indeed, so far as the writer is informed, there is no case on record of recovery from this lesion of the intestines, after extravasation of their contents into the peritoneal cavity has occurred. It seems, however, possible for recovery to take place in cases where such extravasation of feces does *not* occur, either in consequence of the minute size of the rent, or from its being plugged up by the protrusion of the mucous lining.

The *treatment* of this form of injury should be conducted rather with the view of procuring relief from suffering than with the expectation of saving life. Happily that which accomplishes the first-named indication best is also well adapted to secure the latter, if it should happen to be practicable. For the purpose of alleviating pain, opium should be administered with a view to get the narcotic effects of the drug. The quantity required varies with the idiosyncrasies and the special features of the case, some patients requiring more and others less in order to affect them. It is a good plan to give to such patients two grains of opium at the first dose, and afterwards one grain every hour until relief is obtained. Sometimes still larger doses must be administered before the pain abates.

But *gunshot wounds of the intestines* do not always prove fatal. Clinical observation has abundantly shown the correctness of this statement. The writer has seen several cases of recovery wherein the intestinal canal was either penetrated or perforated by gunshot projectiles. The diagnosis was undoubted, because a discharge of feculent matter from the external wound occurred in each of them. Abstracts of *seven* cases of fecal fistulæ produced by gunshot wounds of the abdomen are published in Circular No. 6. A case is also mentioned in the same report, in which a conoidal musket-ball entered at the tip of the ensiform cartilage and remained in the body, and fourteen hours afterwards the projectile was passed at stool. There was no general peritonitis, and the wound healed promptly. Another case is related in the same report, wherein a gunshot wound involving the upper part of the small intestines terminated in recovery. There was a fistulous channel communicating with the calibre of the gut, but the discharge was not feculent. Three ascarides lumbricoides escaped from the wound during the *second* and *third* weeks of the treatment. Another case is mentioned in said report, in which a gunshot wound of the stomach eventuated in recovery. It is also stated in Circular No. 6 that recoveries after gunshot wounds of the large intestines have been much more numerous than after wounds of the ileum and jejunum (p. 26). Prof. Hamilton has collected *eight* cases of fecal fistula produced by gunshot wounds of the intestines in the late war in this country, all of which terminated in recovery. (*Treatise on Military Surgery*, pp. 350-353. New York, 1865.) Numerous examples of recovery from this form of injury are also recorded in the writings of our predecessors. Gunshot wounds of the intestinal canal are less fatal than simple rupture of that tube, because, in the first place, the wound in the abdominal parietes prevents the gases which may escape from the injured intestine from becoming confined in the peritoneal cavity; and, in the second place, the commotion in the coats of the intestine, produced by the passage of the bullet, paralyzes the muscular coat for a time, and thus arrests the vermicular movement of the wounded part of the intestine, and prevents extravasation of feces into the abdominal cavity until adhesion has occurred at the place of injury between the

visceral and the parietal peritoneum, and then the fecal matter may be discharged externally.

The *treatment* of gunshot wounds of the intestines should be conducted with the following objects in view: 1st, to prevent the extravasation of feculent matter into the peritoneal cavity; 2d, to *control* the consecutive inflammation of the peritoneum; and 3d, in the later stages, to support the patient's strength by suitable alimentation. For the fulfilment of the first indication, it is necessary that the patient should be kept as quiet as possible and in the recumbent posture, and that opium or morphia in full doses should be administered; for that of the second indication, opiates should be administered in sufficient quantity to keep the patient free from pain, epispastics should be applied to the abdomen, and the wounds should be kept scrupulously clean. The administration of cathartics should be avoided, if possible. If febrile movement, with thirst, be present, saline drinks, such as liquor potass. citrat., or a solution of nitrate of soda, properly diluted, may be administered with advantage.

In many instances of gunshot wounds involving the intestines, observed during the late war, fecal fistule were produced. They commonly closed after a time, without operative interference, reopening at intervals, and then healing permanently. They therefore gave, in general, but little trouble in their management. (Vide *Circular* No. 6, S. G. O., 1865, p. 25.)

With regard to exploring the track of gunshot wounds of the intestines, the surgeon should always take care that, in case he makes such an exploration, he does not become obnoxious to the charge of meddling interference, and guilty of lessening his patient's chances of recovery by his own officiousness. He should never forget that, in the management of the cases belonging to this category, art, to be useful, must be the servant of nature, and must seek to do good by assisting her mistress in the efforts at repair which she inaugurates, following judiciously the method which she pursues, and not by the introduction of new and violent measures which are liable to aggravate the original injury. For these reasons the writer believes that the recommendations of M. Legouest in relation to the exploration with the finger, and the use of the intestinal suture in cases of gunshot wounds of the intestines, should, except in special cases, not be adopted, and that the old practice should, in general, be strictly adhered to.

5. *Rupture of the kidney* in consequence of external violence, and without external wound, is a traumatic lesion of not unfrequent occurrence. It may be produced by falling, as, for example, by being thrown from a horse, by powerful blows, and by the kicks of draught animals, whereby the kidney and the neighbouring parts are subjected to much violence.

The following symptoms are produced by laceration of the kidney: The injury is generally attended with the production of considerable shock;

there is also pain and tenderness under pressure in the region of the bruised and lacerated organ; the urine is always bloody, provided the injured organ has not been completely destroyed: death takes place either in consequence of consecutive peritonitis, the result of the extravasation of urine into the cavity of that membrane, or in consequence of extensive suppuration of the connective tissue, the result of infiltration with urine. But not all cases of laceration of the kidney prove fatal. Those in which the rupture is slight, generally recover, and there are many examples thereof on record.

The following case affords us an example of gunshot wound involving the kidney. I am indebted to Dr. George A. Mursick, late Asst. Surg. U. S. Vols., for the notes pertaining to it. The subject was attended by him as ward surgeon in the hospital of which the writer then had charge.

CASE VII. Gunshot wound of abdomen, right kidney, and transverse process of third lumbar vertebra; death: autopsy.—Sergt. James A. Bell, Co. I, 8th Illinois Cavalry, æt. 29, of good constitution, was admitted to the Stanton U. S. Army General Hospital, Sept. 25, 1863, with a gunshot wound of the abdomen. He stated that he received it in action on the 22d, near Madison C. H., Va. The bullet penetrated the right hypochondriac region, just below the margin of the ribs. The wound presented a ragged appearance at time of admission. The abdomen was tympanitic, and he complained of having pain in it. The bowels were constipated; pulse 130, and quick; respirations 26, and thoracic; expression of countenance normal. *His urine contained blood.* He was ordered to take pulv. opii, gr. j every three hours, and beef-tea *ad libitum*; and to have simple dressings applied to the wound.

Sept. 26. Condition about the same; increased opium to gr. ij every two hours; *urine continues bloody.*

27th. He appeared somewhat better; pulse 120; respirations 22.

29th. Bowels moved spontaneously; stool contained some blood.

30th, Morning. Pulse 116; respirations 20. 5 o'clock P. M. Abdominal pain and tympanitis increased; pulse 120; respirations 22; countenance expressive of great anxiety; again ordered pulv. opii, gr. ij every two hours.

Oct. 1. Patient much better this morning; pulse 116; respirations 18; pain and tympanitis much less: in afternoon he had a spontaneous evacuation of the bowels which contained some blood; at 5 o'clock P. M. the pulse was 110, respiration 14.

2d. Patient says he feels much better this morning, and is somewhat drowsy; pupils are not contracted; respirations 14.

3d. A. M. Pupils contracted to one-half of the natural size; pulse 110; respirations 11; tympanitis slight; he is very drowsy.

4th. A. M. Pulse 120; respirations 12; tympanitis increased; prescribed morphia sulph. gr. $\frac{1}{3}$ every two hours. P. M. Pulse 130 and feeble; respirations 14; tympanitis increased since morning; pupils no longer contracted; patient sinking; directed the morphia to be continued with sherry wine, f5ss every two hours.

5th. Pulse 128, and feeble; respirations 18, and much embarrassed; ordered the morphia to be continued with sherry wine f5j every two hours.

6th. A. M. Pulse 136, and scarcely perceptible; respirations 22; patient sinking fast. P. M. he died.

Autopsy eighteen hours after death.—Body rather emaciated; abdomen

protuberant; a large ragged-looking wound, about one inch in diameter, in the right hypochondriac region, just below the margin of the ribs. *Thorax.* The left lung and heart appeared to be normal in structure, but were pushed over somewhat towards the left side by a large collection of purulent matter in the right pleural cavity. The right lung was compressed and flattened, especially the middle and inferior lobes thereof, which readily sank in water. Both the pulmonary and costal pleura was covered with a yellowish-white layer of recent lymph. An abscess which had been formed in the connective tissue between the m. m. obliquus and transversalis abdominis, had burrowed upwards beneath the right crus of the diaphragm, and burst into the right pleural cavity. The liver appeared normal. The stomach and intestines were distended with gas. The great omentum and the mesentery were stained with extravasated blood black in colour.

Immediately behind the caput coli there was a large abscess which had burrowed along the psoas magnus and among the muscles of the back. It was lined throughout by a thick layer of false membrane, and in its lower part, immediately against the sacrum, a musket-ball, somewhat flattened, was found. In its course it had perforated the right kidney and likewise fractured the transverse process of the third lumbar vertebra.

The right kidney presented a ragged wound at its lower end. The surrounding connective tissue was much thickened, and lined with a layer of lymph which formed part of the wall of the abscess. The organ itself, on section, presented a pale pink hue and a granular appearance. Its parenchyma was also softened and flabby. The pyramids were almost completely effaced, except one at the upper end of the organ, which had a dark-brownish hue, and its tubes were distinct. Its pelvis had a greenish colour, and its veins were distended with blood.

Comments.—In this case the inflammation of the peritoneum appears to have been completely controlled by the opium, which was administered at the rate of two grains every second hour, and death resulted from the urinary abscess that was formed in connection with the injured kidney. If this abscess had been opened from the outside before it burst into the cavity of the right pleura by burrowing upwards, this patient's life might have been saved. This case, then, demonstrates that, in the treatment of rupture of the kidney, attention must be paid by the surgeon not only to the peritonitis which may be lighted up by that form of injury, but also to the inflammation of the connective tissue in the neighbourhood of the lacerated organ, which may be produced by extravasation of the urine. This case further shows that, in the treatment of abscess resulting from rupture of the kidney, it is a matter of the very highest importance to secure the *early* discharge of the contents of the abscess through an external opening, since, from the looseness of the cellular connections, the pus is apt to burrow widely in such cases, and may even burst into the cavity of the pleura, thereby exciting a fatal inflammation of that membrane. The indications to be followed in the treatment of rupture of the kidney are, therefore, twofold: 1st, to ward off and subdue consecutive peritonitis; and 2d, to protect the patient from the consequences of abscess formed in relation with the injured organ.

Wounds of the kidney appear to be less fatal than wounds of the spleen. It is stated in Circular No. 6, that several cases are reported in which it was believed that recovery took place after gunshot wounds of the kidneys. (*Ibid* p. 27). Hennen relates a very interesting case of this form of injury in which recovery took place (*op. cit.*, p. 330 *et seq.*), and Guthrie refers to two additional cases which he supposes had a successful issue. But Hennen, and likewise Guthrie, remark that the cases on record of recovery from wounds of the kidney are not numerous. The first-named writer expressly declares that the instances of this lesion, wherein he has observed that recovery was established, are very few indeed. (*Op. cit.*, p. 329.)

6. *Rupture of the ureter*.—Mr. Stanley reported two cases of this lesion in the twenty-seventh volume of the *Medical and Chirurgical Transactions*. It is a form of injury that is not often met with. I have never seen an instance of it.

7. *Rupture of the bladder* is sometimes produced by external violence without the occurrence of any lesion of the abdominal walls, or any fracture of the bones of the pelvis. In order for the coats of the bladder to be torn through under such circumstances, it is necessary that the organ should be distended with urine, so as to mount up above the brim of the pelvis at the time when the injury is inflicted. Generally the urine, in such cases, escapes from the ruptured bladder into the peritoneal sac, and excites a fatal inflammation of that membrane. In more rare instances, however, the anterior wall of the organ only has been found to be lacerated, and the urine then is extravasated into the connective tissue of the pelvis. Rupture of the bladder almost always proves fatal. Out of *seventy-eight* cases reported but *five* recovered. In one of them the urine appears to have been extravasated into the peritoneal cavity, in three instances into the connective tissue of the pelvis, and in one case the rupture was only partial.

Dr. Stephen Smith's monograph on rupture of the bladder,¹ which was published in 1851, presents the most satisfactory account of that lesion which the writer has examined. It contains a tabular statement of *seventy-eight* cases, as stated above, of which the following is an analytical summary:—

Sex.—Males 67; females 11; making about 6 of the former to 1 of the latter.

Age.—Under 10, 3; 10 to 20, 3; 20 to 30, 19; 30 to 40, 26; 40 to 50, 7; 50 to 60, 4; over 60, none; adults 16, age not stated.

Condition.—Bladder distended in 30 (of this number 10 subjects were intoxicated, and 5 had urethral stricture); intoxicated, but condition of

¹ A Contribution to the Statistics of Rupture of the Urinary Bladder, with a table of seventy-eight cases. By Stephen Smith, M. D., Assist. Surg. to Bellevue Hospital, New York. New York, 1851.

bladder not stated, 14; in parturition, 4; in good health, 4; doubtful, 2; no note of 24.

Causes.—Direct violence, in 48; concussion, in 15; internal causes, in 9 (of which 4 were instances of parturition, 4 results of urethral stricture, and 1 of retroversion of the uterus); no note of 6.

Primary symptoms.—Severe in 59 (whereof 43 were ruptured into the peritoneal sac, 2 did not involve the peritoneum, 10 into the connective tissue, and 3 not given). Slight in 9 (of which 7 were into the peritoneal sac, and 2 into the connective tissue). No symptoms in 3 (2 ruptured into peritoneal sac, and 1 indefinite). No note of 7. Unable to urinate, 28 (of which 22 were ruptured into the peritoneal sac, 1 did not involve the peritoneum, and 5 into the connective tissue). Able to urinate, 3 (of which 2 were ruptured into the peritoneal sac, and 1 did not involve the peritoneum). Power of locomotion maintained in 7 (all burst through the peritoneum). Felt a sensation as of the bladder bursting, 7.

Progress of cases.—Symptoms continued severe in 48 (of which 39 were ruptured into the peritoneal sac, 7 into the connective tissue, and in 2 the peritoneum was not involved). The symptoms became severe in 10 (in 1 three hours after accident, in 6 two days, in 2 four days, in 1 three days—all ruptured into peritoneal sac except the last). In 1 ability to urinate continued (peritoneum ruptured). In 14 it returned (in 12 of them on the second day, in 1 on the third day, and in 1 on the fourth day). Locomotion continued in 2 (both ruptured into the peritoneum). Bloody urine drawn in 25; clear in 4. Symptoms were mild in 2 (both ruptured into the connective tissue).

Result.—Died, 73. Within 5 days, 44 (36 being ruptures into the peritoneum, 2 into the connective tissue, and 6 not stated). Between 5 and 10 days, 22 (17 into peritoneum, 3 into connective tissue, and 2 not involving peritoneum). Between 10 and 15 days, 2 (both into the connective tissue). Between 15 and 20 days, 3 (1 into the peritoneum, and 2 into the connective tissue). Above 20 days, 2 (both into the connective tissue). One of them lived 42 days. Recovered 5, as already stated.

Condition of bladder found post-mortem.—Ruptured into the peritoneal sac in 50 cases; in the anterior wall of the organ in 9, and at the neck in 6 instances. The bladder was firmly contracted in 17 cases. (Vide *op. cit.*, pp. 42, 43.) No apology seems necessary for presenting the foregoing summary, since it is likely to prove entirely new to most readers.

The following case is an example of *contusion of the bladder*, and is introduced in this place because of its intimate relationship with lacerated wounds of that organ.

CASE VIII. *Fracture of pelvis; very extensive contusion of the bladder; death on the third day; autopsy.*—John Rankin, a young man, set. 22 or 23, was caught and very severely injured by the falling walls and timbers of a brick house, in process of erection, in Thirty-Second Street near Eighth Avenue, on the afternoon of March 27. The amount of the "shock" was very great, and reaction did not fully occur. He complained of having intense pain in the pelvis. He could not pass any urine, and it was drawn off with the catheter at proper intervals. He lingered till the morning of the 30th, when he died.

Autopsy thirty-one hours after death.—The body is in a good state of preservation. The *rigor mortis* is very strong. The *os pubis* is fractured

on each side at a point about three inches distant from the symphysis. On the right side the displacement of the fractured bones is considerable. The bladder presents a singular appearance. Externally it has a reddish-brown colour. It is nearly empty but not contracted. It contains a small quantity of urine having a natural appearance, but it is not contracted down upon said liquid. Its walls are very much thickened, being between half and three-fourths of an inch through from surface to surface. This great increase in thickness has been occasioned by sero-sanguineous infiltration of the tissues, constituting its walls. On section, the cut surface presents a reddish-brown colour. The mucous membrane lining the interior is blackened and reddened in patches and points, but it is not softened. The organ was not ruptured. There was no diffuse peritoneal inflammation. There was no lymph or pus on the peritoneal investment of the injured organ. There was, however, a little colourless or transparent serum in the peritoneal cavity. The intestines were distended with flatus.

In this case the muscular coat of the bladder was paralyzed by the injury it had sustained, and by the infiltration of its texture with sero-sanguineous fluid, or, in other words by the inflammatory process. It will be remembered that in this way the walls of the organ became very much thickened, and measured between one-half and three-fourths of an inch through from surface to surface.

But it not unfrequently happens in cases of fracture of the pelvic bones that the bladder is not only bruised, as it was in the case last related, but ruptured also. Of the 78 cases collected by Smith, rupture of the bladder was complicated with fracture or other severe injury of the bones of the pelvis in 15 instances (11 were ruptured into the connective tissue, 3 into the peritoneum, 1 not stated). The laceration of the walls of the bladder may be produced either *directly* by the same mechanical force as occasions the pelvic fracture, acting upon the organ while distended with urine, or *indirectly* by displacement of the broken bones, or osseous splinters and fragments of comminution may be driven into the organ from the place of fracture.

Again, rupture of the bladder sometimes occurs in connection with urethral stricture, and as a natural result thereof. Smith's table presents *four* examples of this variety of the lesion. In all of them the bladder appears to have been distended with urine when the accident happened. In two of them the laceration occurred while endeavouring to pass urine, in one while straining at stool, and in the remaining one it was occasioned by the passage of a coach wheel over the belly.

Furthermore, rupture of the bladder sometimes occurs in females during parturition. Smith's table contains *four* cases in which this accident was met with. Two of them were primiparous, and the second stage of labour appears to have been protracted and difficult. Concerning one of them it is stated that she was in good health, and that the labour was easy. In the remaining case the particulars of the labour are not given.

And, rupture of the bladder is occasionally induced in the female by

retroversion of the uterus. Smith mentions a case belonging to this category. The subject was pregnant. The uterus became retroverted, and the neck of the organ pressing against the urethra prevented the flow of the urine through that tube. She suffered retention *seven* days, when she felt something burst within her, and immediately experienced relief from the feelings of distension of the bladder and the desire to urinate. Death occurred on the second day, and nine or ten pints of urine were found in the cavity of the abdomen.

In most instances, however, the subjects of this lesion of the bladder have been intoxicated and engaged in pot-house brawls; the first circumstance predisposing them to a distended bladder, and the latter to unresisted, direct, external violence. (Smith, *op. cit.*, p. 5.)

Symptoms.—The symptoms produced by this accident are, from the outset, generally severe. Sometimes, however, they are but slight; and, in occasional instances, none are apparent till some time afterwards. When severe, they consist of intense pain in the hypogastric region, speedily followed by collapse and great desire to pass urine with repeated but ineffectual attempts to void it, a rapid and feeble pulse, and a pinched and anxious countenance. Urine withdrawn by catheterization at this stage is generally found to contain blood. In 29 cases of vesical rupture, the urine was bloody in 25, and clear in but 4. The patient sometimes dies at this period, apparently from shock. But if reaction takes place, the symptoms succeeding it will vary according to the part of the organ that is injured. For example, if the bladder bursts into the peritoneal sac, the symptoms of acute peritonitis rapidly supervene; but if it is ruptured into the connective tissue, the symptoms of urinary infiltration are produced. Occasionally, however, the symptoms at first are slight, even when the place of rupture is in the posterior wall of the fundus, not preventing sleep or even the usual occupation of the patient; but these are, sooner or later, followed by the most aggravated signs of acute peritonitis; the belly becomes tumid, tense, and very tender; the respiration thoracic, for the movements of the diaphragm almost entirely cease; the legs are drawn up towards the trunk; vomiting of bilious matter, with, perhaps, hiccough also, supervenes; the functions of the bladder continue more or less disturbed; and, finally, when dissolution approaches, all the most prominent symptoms subside, and the sufferer dies in possession of his reason. (*Op. cit.*, p. 8.)

The *diagnosis* of rupture of the bladder is generally not difficult to make. The parts subjected to injury, the nature of the violence, and the method of its infliction, the pain in the hypogastric region, the disturbance, arrest, and perversion of the functions of the bladder occasioned by the injury, the bloody appearance of the urine withdrawn by catheter, and oftentimes the patient's consciousness that his bladder has burst, when

taken together, almost always render the diagnosis tolerably certain and clear.

Prognosis.—Speaking of rupture of the bladder a recent English writer, Mr. Henry Thompson, says: "In any case a recovery has never been known to happen, and can scarcely be regarded as possible." (*Vide Holmes' System of Surgery*, vol. iv, p. 423. London, 1862.) This assertion, however, is not in accordance with the statements that have been placed on record concerning this accident by several different trustworthy observers, and certainly appears very remarkable when we reflect that Mr. John Birkett, in the second volume of the same system of surgery (p. 481), refers to three cases of rupture of the bladder which recovered; and in the foot-notes mentions, severally, the names of the surgeons whose patients they were, and likewise directs the reader to the original records concerning each of them. As already stated, Dr. Stephen Smith, in his table, presents five cases of this lesion in which recovery took place; and if we add to these one case mentioned by Birkett and not included by Smith (Mr. Porter's patient), we have a total of *six* recorded cases of rupture of the bladder that eventuated in recovery. So much for Mr. Thompson's erroneous statement. It must at the same time be admitted that the percentage of recovery from rupture of the bladder is very small.

Treatment.—Since this accident is not unfrequently met with, and, at the same time, is extremely fatal, its treatment becomes a subject of considerable interest to all who desire progress in the science and improvement in the art of surgery. We have already seen that rupture of the bladder may prove fatal in three different ways, viz: 1st, by the "shock" which accompanies the infliction of the injury; 2d, by consecutive peritonitis resulting from extravasation of urine into the peritoneal cavity, in cases where the bladder bursts in that direction; 3d, by sloughing of the cellular or connective tissue in cases where, from the situation of the rupture, the urine is extravasated into that tissue, instead of into the peritoneal sac, together with the exhausting suppuration which, in chronic cases, is likely to follow that form of the accident.

Now, it is obviously the duty of the surgeon, in treating rupture of the bladder, to endeavour to obviate the tendency to death occurring in the several ways mentioned above. He must, in the first place, take care that his patient does not die of "shock;" for which purpose he will prescribe such restoratives and stimulants as the amount of depression and other symptoms may demand. He must, in the second place, endeavour to save his patient from the consequences of extravasation of the urine, which have already been stated. Indeed, so far as the injury to the bladder itself is concerned, this accident does not appear to be specially dangerous to life. This viscus is not an organ of secretion, nor of nutrition, nor of any of the vital operations. It is mainly an organ of convenience, a reservoir or bag for the reception and retention of the urine temporarily, or until such time

as it can be expelled from the body without detriment thereto, and without interfering with the comfort of the animal. The destructive consequences of the accident under consideration result mainly from the inflammation that is kindled in the tissues with which the extravasated urine comes in contact external to the organ itself.

It therefore becomes a matter of the highest importance in the treatment of rupture of the bladder to secure promptly a free outlet or discharge of the urine upon the exterior of the body, for in no other way can a *continuance* of the extravasation of that liquid into the peritoneal cavity or into the connective tissue, as the case may be, with all its distressing consequences, *be certainly avoided*. It will be of little use to attempt to treat peritonitis occasionally by urinary extravasation until the extravasation itself, the outflow of urine from the bladder into the peritoneal bag through the rent, is discontinued; for we cannot hope to cure any disease while the cause, especially if it be mechanical or chemical in its nature, continues to multiply itself in active operation.

The free discharge of the urine from the bladder externally, must therefore be deemed as an indispensable condition, as a *sine qua non*, in the treatment of this lesion; and, since the urine flows continuously into the bladder through the ureters, its equally continuous outflow or discharge from the bladder should, therefore, be secured by the surgeon's art.

Now, there are several methods or surgical procedures by which this result can be more or less completely attained, and we will next proceed to consider them and their respective merits. They are: 1st. The employment of a catheter. 2d. Puncture of the bladder above the os pubis. 3d. Puncture of the bladder through the rectum; and, 4th. Cystotomy performed by cutting through the perineum as in the operation for stone. The last method appears to possess decided advantages over all the others, at least so far as the male subject is concerned. With regard to the first method, or catheterization, it should be borne in mind that the discharge of the urine through the instrument, as the patient lays on his back in bed, takes place against the action of gravity, since the orifice of the catheter is on a higher level than the bladder, and, consequently, the urine must be forced through the instrument, either by the contraction of the muscular coat of the organ, or by compressing it with the surgeon's hand, aided by the voluntary contraction of the abdominal muscles; and it should not be forgotten that the same effort which forces the urine through the catheter may, at the same time, force it through the rent in the bladder, thus increasing the quantity of extravasated urine, and diminishing the chances of recovery in a corresponding degree. This alone constitutes a serious objection against trusting to catheterization alone to secure a satisfactory emptying of the bladder in treating rupture of that organ. There is, however, still another difficulty which possesses considerable weight, viz., in many, perhaps in a majority of cases, the urethra will

not tolerate the long-continued presence of the instrument in the bladder, and without such presence, an injurious accumulation of the urine cannot, with certainty, be prevented, even in the most favorable cases. With regard to the second method, or puncturing the bladder above the os pubis, the surgeon will not be likely to employ this procedure for the purpose of keeping the bladder clear of urine in cases of rupture thereof, since it is much less likely to accomplish that result than catheterization. It may, however, be sometimes employed as a temporary expedient when the catheter cannot be introduced, and immediate relief from over-distension is necessary; but the bladder speedily contracts in cases of rupture, and the canula (above the pubes) cannot therefore be allowed to remain. Puncturing the bladder through the rectum also may sometimes be advantageously performed for the temporary relief of over-distension in cases of rupture of that organ; but as the contents of the rectum move downwards to escape in the act of defecation, they will not allow the canula to remain *in situ*. Puncturing the bladder, either above the pubes or through the rectum, should be considered only as temporary expedients which may sometimes be employed. Cystotomy, however, performed by the lateral method as for stone, fulfils all the conditions required to keep the bladder empty; it allows the urine to escape without effort on the part of the patient, and, as it were, spontaneously, almost as soon as it is received into the organ from the ureters. It is not open to any of the objections which pertain to the employment of the catheter in the treatment of rupture of the bladder, and, at the same time, is not *per se* a very dangerous operation. This procedure has been successfully employed by an American surgeon, Dr. Walker, of Boston, in a case of rupture of the bladder complicated with fracture of the pelvis, occasioned by rail cars, and the patient made a rapid recovery, although his condition appeared to be nearly hopeless at the outset. (*Vide Med. Comm. Massachusetts Med. Society*, Vol. VII., Art. IV., Case 6, 1845.)

The surgical treatment (operative) required in cases of rupture of the bladder embraces something more than what is necessary for the relief of retention of urine; for, when the organ is ruptured, the urine, even when not abundant, has a tendency to escape, not only through a natural channel, the urethra, but through an accidental passage, the fissure (and to the great detriment of the patient), whereas, in cases of retention, the urine has an outlet through the urethra alone (unless the bladder burst from over-distension). While, therefore, in the treatment of retention, it is only necessary for the surgeon to draw off the urine at suitable intervals, it is his duty in treating rupture of the bladder to provide also that the urine shall not continue to escape through the rent into the cavity of the peritoneum or into the connective tissue. This point seems to me of great practical importance, and one which has not been sufficiently regarded.

When the urine has been extravasated into the cavity of the peritoneum,

should paracentesis be performed for its removal? If it is deemed advisable to employ this operation, the pelvic cul-de-sac, into which the extravasated urine settles, should be punctured through the rectum, as recommended by Dr. Harrison. This procedure will be more likely to prove useful in cases where the amount of the urinary extravasation is large.

We have already said that rupture of the bladder is a very fatal lesion, and that in *seventy-eight* cases but *five* recovered. *Gunshot wounds* of said organ, however, appear to be much less destructive to life, although at first sight one would be likely to suppose just the reverse to obtain. The writer has seen two cases of gunshot wounds of the bladder make good recoveries, wherein the projectile passed completely through that viscus. They were treated with opium or morphia administered for the purpose of controlling the peritoneal inflammation, with catheterization at regular intervals performed with a view to prevent distension of the organ from urine, and with suitable alimentation to maintain the patient's strength. In all cases of laceration of the bladder great care should be taken in the introduction of the catheter, lest by pushing its point too far it may be passed through the rent into the peritoneal cavity.

The next case is an instance of gunshot wound involving the bladder which eventuated in recovery. A super-pubic, urinary fistula was formed which lasted about five months before it was completely closed. This patient also had gonorrhœa at the time when the wound was inflicted, and the treatment of the traumatic lesion was necessarily complicated with that required for this disease.

CASE IX. *Gunshot wound of abdomen and pelvis; bullet passed through bladder; recovery.*—Sergt. I. H. Post, Co. H, 61st N. Y. Vols., was admitted to the Stanton U. S. Army General Hospital, May 18, 1864, for a gunshot injury. He stated that his wound was inflicted in action at Spottsylvania C. H., May 12, by a musket-ball, that he had just fired his own gun when he got hit, and that the fight occurred in a wood. On examination it was found that the bullet entered two and a half inches to the *left* of the median line, and one and a half inch above Poupart's ligament; that it passed downwards, backwards, and to the right side through the bladder, and that it finally escaped from the *right* nates. The projectile also grazed the os pubis. Urine flowed out through the wound of entrance, but none escaped from the wound of exit. His general condition was rather feeble, and he complained of having a good deal of pain in the lower part of his bowels. He also had gonorrhœa. Prescribed pil. opii, gr. j every three hours, or as often as may be necessary to keep him and his bowels quiet and free from pain, rest in the recumbent posture, catheterization thrice daily, simple dressings for wound, and a milk diet.

May 19. Same treatment continued, with the addition of *mistura co-paibæ* for the gonorrhœa. He voids considerable urine by the natural passage.

June 21. Prescribed egg-nogg three times a day, and a nourishing diet; opium, etc., to be continued. Under this treatment the case progressed satisfactorily, and about the middle of July the urine ceased to escape through the track of the wound.

July 24. He was attacked with diarrhœa, which was controlled with pil. camphor et opii. Afterwards some urine began to flow again from the orifice of entrance of the bullet.

Sept. 7. A little urine continues to escape from the wound of entrance, but the fistulous passage is steadily contracting. He is now in good flesh and spirits. His general condition is excellent in every respect.

18th. He has some pain and soreness in the posterior part of the track of the bullet, which is being relieved by a discharge of purulent matter *per rectum*. In every other respect he is doing well.

23d. The discharge of pus has ceased. The pain and soreness also have disappeared.

Oct. 9th. He continues to do well, and his wound is nearly healed. The orifice of entrance has been kept open by exfoliation of small pieces of necrosed bone from the os pubis.

Comments.—Dr. Otis remarks, in Circular No. 6 (p. 27), that gunshot wounds of the bladder, when the projectile entered above the pubes, or through the pelvic bones, have always proved fatal during the late war, so far as the records have been examined. There are, however, many examples of recovery from injuries of the parts of the bladder which are not covered by the peritonœum. The case just related appears to form an exceptional instance, since the patient recovered from a *supra-pubic* gunshot wound, involving the bladder. Guthrie has related¹ six cases of gunshot wounds of the bladder, in all of which recovery took place. In three of them the bullet entered above the os pubis, and in one instance over Poupart's ligament. In several of those cases reported by Guthrie it seems pretty certain that extravasation of urine into the peritoneal cavity occurred, but this liquid was not confined therein, for it immediately flowed out externally through the track of the gunshot wound. Thus, we have shown to us the reason why gunshot wounds of the bladder are much less fatal than simple ruptures of that organ; for, in cases of the first-named lesion the urine which is extravasated into the peritoneal cavity, or into the loose connective tissue of the pelvis, may escape externally through the wound made by the projectile, but in cases of the last-named lesion the urine is, as it were, imprisoned within the tissue or cavity into which it happens to be extravasated, and, remaining there, it kindles a destructive inflammation.

The following case presents us with an example of gunshot wound of the bladder, and is chiefly remarkable for the length of time that the patient survived extensive injury, not only of the bladder, but also of the peritonœum, and the bones of the pelvis:—

CASE X. Gunshot wound of pelvis involving bladder: the bullet passed through the hips from side to side: urine flowed from the orifice of entrance: death on the 21st day from peritonitis.—Private Wm. Hesling, Co. I, 9th U. S. Cav., æt. 19, was admitted to the Stanton U. S. Army

¹ Commentaries on the Surgery of the War in Portugal, Spain, France, and the Netherlands, &c. By G. J. Guthrie. Sixth edition. Phila. 1862.

General Hospital (Ward 4, care of Dr. C. R. Nelden, A. A. Surg. U. S. A., to whom I am indebted for the notes of the case), June 4th, 1864, for a very severe wound of the pelvis inflicted by a musket cylindro-conoidal bullet, five days previously (May 30th), in battle at Salem Church, Va. The projectile entered the right hip about two inches behind the trochanter major, and, having passed through the pelvis in a transverse direction, made its exit from the left hip about two inches behind the great trochanter of that side. It passed through the bladder from side to side. At time of admission to hospital, the wound looked well, but his general condition was not favourable, as he had considerable pain in the pelvic region, and was much debilitated. The urine escaped in large quantity from the orifice of entrance. Some urine, however, was passed spontaneously through the urethra. Prescribed the water dressing for the wounds, catheterization four times daily, pil. opii, gr. j every three hours, and a nourishing diet, with milk-punch.

June 8. Hemorrhage occurred from the orifice of entrance in the right hip. It was arrested by the use of liquor ferri persulph. ; other treatment continued.

11th. Urine still flows from the wound in the right hip. Patient complains of having more pain. Ordered pil. opii, gr. j every two hours, and spiritus frumenti, f5v daily.

15th. Patient again has some hemorrhage from wound in right hip. He has more pain still and is failing in strength. Prescribed pil. opii, gr. j every hour, and other treatment continued. But he continued to grow worse, and died June 20th. Hemorrhage occurred from both the orifice of entrance and the urethra on the day of his death.

The *autopsy* showed that the bullet passed through the bladder from side to side, *i. e.*, transversely, and that the intestines and other abdominal viscera were agglutinated by grayish-white or ash-coloured, soft, plastic exudation, the product of recent diffuse peritoneal inflammation.

Death in this case appears to have been produced by exhaustion—exhaustion that was occasioned by the diffuse peritonitis on the one hand, and by the extensive injury of the soft parts and of the bones of the pelvis inflicted by the projectile on the other. And when we reflect that, in this case, the urine flowed freely from the bladder through the holes in its walls into the peritoneal cavity, it seems remarkable that the patient survived his injury for so long a period as three weeks. This result must, without doubt, be attributed, to considerable extent, to the fact that the urine escaped readily from the cavity of the peritoneum through the wound of entrance, and thus that membrane was shielded from the destructive effects which would have been produced upon it by contact with the urine when in a decomposing condition.

In one of Guthrie's cases the ball remained in the bladder, and became the nucleus of a calculus, which was removed by the operation of cystotomy, and the patient recovered. Guthrie also alludes (*op. cit*) to a case like his own that occurred in the service of the East India Company. The wound was inflicted at the battle of Chillianwallah. The projectile, together with the calculus which had formed round it, were extracted by operation, with a good result. Furthermore, Guthrie quotes from Baron Percy another case

belonging to the same category. That surgeon removed from the bladder of a young man, wounded by a pistol-ball, the projectile itself, a fragment of shirt, and some coagulated blood, before calculous concretions had had time to form around them. (*Op. cit.*, pp. 553, 554.) Hennen informs us that an operation similar to Guthrie's was performed at St. George's Hospital, on a soldier who was shot at the siege of Lisle, and operated on in the following spring; a view of the calculus is given by Cheselden, in his work on the *High Operation*, London, 1723, Plate X. Garengeot relates the case of an officer who was operated on for a stone, the nucleus of which was a musket-ball, that had entered the bladder ten years previously. (*Traité des Operations de Chirurgie*, tom. i. p. 17, Paris, 1730.) Hildanus gives an instance where a ball remained in the bladder for thirty years. (*Cant. 3, Obs. 67.*) Ballingall has collected nineteen examples belonging to the same category as the foregoing.

In cases of gunshot wounds of the bladder pieces of clothing and fragments of bone are not unfrequently carried forward by the projectile, and left in the cavity of that viscus. Now, such of these foreign bodies as are sufficiently small in size, may be discharged in the urine through the urethra, but the other and larger fragments are certain to do mischief, through the irritation which they must occasion, and if they are not extracted in a timely manner by surgical art, they will become incrustated with urinary deposits, and thus constitute the nuclei of stone. Many cases belonging to this category have been observed. The presence of these foreign bodies in the bladder can generally be detected without much difficulty by the aid of sounds.

The chief points which demand attention in the *treatment of gunshot wounds of the bladder* are, 1st, to prevent urinary extravasation into the neighbouring parts; 2d, to subdue inflammation, and, 3d, to remove foreign bodies, especially those which may chance to be lodged in the cavity of the organ. The *first* indication is generally attempted to be accomplished, in military practice, by the introduction of a flexible catheter into the bladder, and allowing it to remain there, or, in cases which do not tolerate the constant presence of the instrument, from morbid irritability of either the urethra or the bladder, by catheterization performed several times a day, whereby any undesirable accumulation of urine may be rendered impossible; but, in the writer's opinion, cystotomy performed by the lateral method would prove useful in many cases. The *second* indication may be fulfilled by quietude, by cleanliness, by suitable alimentation, by the administration of opiates and saline drinks, *p. r. n.*, by the judicious employment of epispastics and local depletion, and by the early and thorough evacuation of the contents of any urinary abscesses which may be formed. The *third* indication will generally require for its accomplishment the operation of cystotomy. The selection of the particular operative procedure, however, depends much upon the size, shape, and nature of the foreign body,

the situation and direction of the gunshot wound, etc. For example, the discharge of pistol-balls and pieces of clothing from the bladder might be effected in most instances by dilating the urethra to sufficient extent, by the introduction of sounds adapted to the purpose, as if the urethra were being prepared for the performance of Civiale's operation of lithotritry, and by the employment of long, narrow-bladed forceps, after the urethra is sufficiently dilated. But foreign bodies which are too large for extraction in this way, will generally require the performance of an operation analogous in every respect to that of lithotomy.

CASE XI. Rupture of an ovarian tumour from violence: diffuse peritonitis: death in about 48 hours: autopsy.—A married woman named Fanny Powal, æt. about 35, and of intemperate habits, was severely beaten by her husband on Sunday morning, July 11, and died on the following Tuesday morning. They resided at No. 105 Washington Street. I did not learn what the symptoms were that followed the injury.

Autopsy, Tuesday, July 13, 1½ o'clock P. M.—Cadaver pale and thin; small bruise on right arm, and another on right side of neck. While dissecting off scalp, found a small bruise on cranium near vertex, and another on forehead, both near median line. Skull very thick. Cerebrum natural. Cerebellum rather softer than natural. Lungs natural. Heart rather fatty. Both auricles and the right ventricle contain clots. Mitral valve thickened, and exhibits some vegetations (so called) at margin.

Abdomen much swelled. Its cavity contains more than one gallon of sero-sanguineous fluid. The peritoneal coat of the small intestines exhibits an abundant quantity of recent plastic exudation, dirty white in colour, smeared over its surface. The peritoneal investment of the liver presents a similar appearance. The liver itself is much enlarged, fatty, and softened. There is an *ovarian tumour* of the left side, as large as the head of a new-born infant, which is divided into several compartments, or consists of several large cysts. Said tumour has recently been ruptured, in a vertical direction, at its antero-upper part. The fissure is more than two inches long. Here the walls of the cyst are thin. The contents thereof had escaped into the cavity of the abdomen, and produced diffuse peritonitis. The other cysts were not ruptured. One of them contained a semi-liquid substance which looked like purulent matter. The uterus was normal. The stomach and kidneys were not examined.

Comments.—This case, according to the writer's information, is unique. A woman afflicted with polycystic disease of the left ovary was badly beaten by her husband. The ovarian tumour had not yet attained a large or even a troublesome size, but, the walls of the uppermost cyst being thin, the violence sufficed to lacerate it extensively. The contents of this cyst were extravasated into the cavity of the peritoneum, and thus a diffuse inflammation of that membrane was excited, which rapidly proceeded to a fatal termination. It is probable that the intemperate habits of the subject also exerted considerable influence in increasing the intensity and promoting the diffuseness of the peritoneal inflammation. But rupture of ovarian tumours having a large size, more especially those which are cystic in structure, with thin walls, is an accident that is likely to occur not unfre-

quently on the application of violence to the exterior of the abdomen. It may be produced by falls, blows, kicks, etc., upon the belly, and, in general, the thinner the walls of the tumour are, other things being equal, the more readily is the rupture effected. Now, the results which may be occasioned by rupture of an ovarian tumour occurring in this way are threefold: 1st, diffuse peritonitis may be excited, and rapidly prove fatal, as happened in the case which has just been related; 2d, circumscribed peritonitis may be kindled, and occasion the death of the subject at a later period; and 3d, in cases where the ovarian tumour has contracted adhesions to the intestinal canal, and the rent occurs in that direction, the discharge of the contents of the tumour into the intestinal canal may be followed by destructive inflammation commencing within the tumour itself. In some rare instances, however, the inflammatory irritation excited by the rupture, etc., is of such a grade as to arrest the growth of the tumour, and ultimately cause its absorption. Such cases are called instances of the accidental or spontaneous cure of ovarian disease. The writer has here called attention to rupture of ovarian tumours because it is obviously the duty of every surgeon to make himself familiar with the subject.

332 SIXTH AVENUE, NEW YORK, January 31, 1867.

ART. III — *On the Internal Use of Chloroform in Intermittent Fever.*

By E. McCLELLAN, M. D., Asst. Surgeon U. S. Army.

WHEN our paper was published in the number of this Journal for July, 1866, the majority of the cases in which chloroform had been exhibited were but recently under observation. Although the power of chloroform in arresting the *cold stage* had been determined, sufficient time had not elapsed to demonstrate any power which the remedy might possess over that morbid action which culminates in the paroxysm, or to show whether injurious results were likely to follow its continued employment, either through direct action, or by accumulation in the system.

The disease, in the great number of cases under observation, being in its primary form, yielded readily to the influence of quinia; and in such cases the chloroform was of undoubted value in relieving the patient of the physical prostration which would otherwise have succeeded the paroxysm; but a large number of the cases became, indeed, "*Pièrres intermittentes rebelles.*" The cold stage yielded to the use of chloroform, the hot and sweating stages were modified by its action, and the disease disappeared on the exhibition of quinia or arsenic, only to return after short intervals of repose.

It was suggested by my friend Dr. Edward Hartshorne, of Philadelphia,

to test the efficacy of iodine in these cases, the use of which, in the form of a tincture, had been recommended by M. Sequin, of Aibi (vide *Iodothérapie*, par A. A. BOINET, p. 786), not as a substitute for the preparations of cinchona, but as possessing great value in those chronic cases which have for a length of time resisted the action of quinia.

The preparation which was adopted for use was the *Liquor Iodini Compositus* (Lugol's Solution), and its effect is shown by the following cases:—

CASE I.—Corporal S., aged 26 years, a native of Hesse, had for the past five years been liable to attacks of intermittent fever, on account of which he had four times been under treatment during the past twelve months. Was admitted to hospital July 1, 1866, when in the first stage of the paroxysm. Chloroform, $\mathfrak{m}\text{lv}$, was administered; the chill subsided in a few moments, and the remaining stages occurred during the sleep induced. He was placed upon Lugol's solution, $\mathfrak{m}\text{xxv}$ every three hours; sixty minims to be taken during the twenty-four hours. This was continued until the 6th inst., when the dose was increased to $\mathfrak{m}\text{xc}$ during the day. The solution was administered in simple syrup, and produced no symptoms of irritation. It was continued until the 16th inst.; and on the 29th, there being a constant improvement in his physical condition, he was returned to duty. For the past six months there has been no return of the disease.

CASE II.—Private P. McC., aged 42 years, a native of Ireland, had suffered severely with intermittent fever, contracted while on duty near Yorktown, Va., in the early part of 1864. Had frequently been under treatment, and the disease yielded but temporarily to the action of quinia. Was admitted July 1, 1866, while in the cold stage, which yielded immediately to the action of a full dose of chloroform; he was placed upon the iodine solution, $\mathfrak{m}\text{lx}$, to be taken at regular intervals, and during the twenty-four hours.

July 3. The paroxysm recurred, and again yielded to the influence of chloroform. The dose of iodine was now increased to $\mathfrak{m}\text{xc}$ during the twenty-four hours.

5th. No recurrence. Solution continued.

7th. A severe paroxysm, which again yielded to chloroform. The dose of the solution was now increased to $\mathfrak{m}\text{c}$, and continued until the 12th inst., when symptoms of stomach irritation occurring, it was abandoned.

26th. He was returned to duty; no recurrence of the disease.

CASE III.—Private C. R., aged 28 years, in whom the disease was developed September, 1865, was admitted for treatment July 3d, 1866, the chill having reappeared the previous day. Had been free from the disease since May.

July 4. The paroxysm occurred at 10.20 A. M. Chloroform, $\mathfrak{m}\text{lx}$, produced a sleep of two hours' duration.

5th. Was placed on Lugol's solution, $\mathfrak{m}\text{lx}$ to be taken during the twenty-four hours, $\mathfrak{m}\text{x}$ at a dose, which was continued until the 14th inst., when, there being no recurrence of the disease, it was discontinued, and the case held under observation. On the 18th, premonitory symptoms appearing, chloroform was exhibited, and the iodine solution continued as before.

23d. There being no recurrence of attack, all treatment was abandoned. On the 30th he was returned to duty, and has had no relapse.

CASE IV.—Mrs. M., aged 43 years, a native of Ireland, had suffered from

the disease since Sept. 1865. Was much prostrated by the severity of the attack.

1866. *June 30.* The chill recurred at 9 A. M. Chloroform, m_{lx} , procured a sleep of about thirty minutes.

July 1. Was placed upon Lugol's solution, m_{v} every three hours, until m_{xxx} were taken.

3d. The dose was increased to m_{x} every three hours, and continued until the 10th inst. Has since been free from the disease.

CASE V.—C. M., aged 9 years, daughter of the subject of previous case, had been liable to attacks of fever for seven months.

July 1. Upon the recurrence of the paroxysm, was brought under the influence of chloroform, m_{xxx} , which produced the full hypnotic effect, this lasting for several hours, during which the attack was exhausted.

Lugol's solution, m_{ij} , to be taken four times a day, was then prescribed, and thereafter continued until the 8th inst. She has since been free from the disease.

CASE VI.—Private J. F., aged 32 years, contracted the ague in July, 1865. Has been twice under treatment during the year.

1866. *July 11.* The paroxysm occurred at 5.55 A. M. Chloroform, one fluidrachm, was administered without effect. At 6.5 A. M. this dose was repeated, and the cold stage was promptly arrested; but the patient, though drowsy, did not sleep. The hot stage came on with much vigour, and at 7 A. M. he vomited profusely, which relieved the severity of the symptoms. Was placed upon Lugol's solution, m_{x} every three hours.

13th. The paroxysm occurred at 6.20 A. M. A fluidrachm of chloroform was administered, from the effects of which he slept soundly until 7.30 A. M. On awaking, some symptoms of the cold stage returned; the dose was repeated, completely arresting the chill, but the paroxysm was not ended until 3 P. M.

15th. The attack commenced at 7.45 A. M. The cold stage was arrested by chloroform in two seconds, and in ten seconds more the patient was in a sound sleep, which lasted until 9 A. M., when he awoke entirely free from the attack. The iodine solution was continued until the 19th. After this date, there being no return of the paroxysms, the patient was held under observation, but without treatment, until the 23d, when he was returned to duty, and has since been well.

The action of chloroform in obliterating the second and third stages of the paroxysm in Case V. of the previous paper (*Am. Journ. Med. Sci.*, July, 1865) induced the belief that this remedy might be of value in arresting the disease, or at least in breaking up its periodicity.

CASE VII.—Lieut. S., whose case was reported in the former article above referred to (Case VI.), remained free from the disease until Sept. 21 of that year. On this day, at 4 P. M., he was again attacked, and I found him in a violent chill, with apparently much physical distress. A large teaspoonful of chloroform was administered, probably somewhat more than a fluidrachm, and in one minute and a half the chill had subsided. The sleep produced lasted for several hours, during which the remaining stages of the paroxysm occurred.

The disease developing as a double tertian, I proposed to the patient that the prophylactic power of chloroform should be tested in his case.

To this he readily assented; and, being furnished with a minim glass, he was directed, upon the slightest symptoms of the chill, to retire at once to his bed, and to take mlx of the remedy. He was also ordered Lugol's solution, mxv every three hours.

Sept. 22. On the occurrence of a slight headache and languor, at about 3.30 P. M., a fluidrachm of chloroform was taken. The sleep produced lasted two hours, during which some febrile excitement was the only symptom of the paroxysm apparent. On awaking, he complained of languor and depression, which continued for several hours.

23d. Chloroform having been taken at 1 P. M., the sleep lasted one hour, and was followed by a feeling of depression, as on yesterday, although not sufficient to prevent the performance of his duty.

24th. Chloroform administered at 12 M. The sleep lasted twenty-five minutes. No depression, or signs of the paroxysm.

25th. Complained of the excessive action of his kidneys throughout the previous night. The chloroform not again required. Continued the iodine solution until the 30th. As yet there has been no return of disease.

CASE VIII.—Private F., aged 20 years, a native of the swamp district of Virginia, had for years suffered severely with intermittent fever. From a slight injury of the leg a large indolent ulcer was established, which for many months resisted treatment. During its existence he was perfectly free from the fever. His physical condition having improved and the ulcer disappeared, the cicatrix becoming firm, he was returned to duty, and, after the first exposure to inclement weather, again complained of intermittent fever.

Oct. 6. Was admitted to hospital while in the cold stage. A fluidrachm of chloroform arrested the chill, and produced a sleep of over two hours. He was placed upon sulphate of quinia; and chloroform, mlx , was directed to be administered upon the approach of a paroxysm, or, if possible, in anticipation of one.

8th. At 9 P. M. a fluidrachm was given in anticipation, and produced a sleep of three hours. No symptom of chill during the day.

10th. Patient expresses himself as feeling perfectly well. Chloroform not to be given unless premonitory symptoms should occur.

12th. Has had no chill since the 6th inst. Quinia discontinued.

When formerly under treatment, he had improved very rapidly under the influence of cod-liver oil; and, as he was somewhat debilitated, he was again placed upon full doses. Under the influence of the oil he rapidly improved; and since his return to duty, although constantly exposed to the changes of weather, he has suffered no relapse.

The very rapid and marked improvement apparently produced in this case by the cod-liver oil induced me to place others under its influence when recuperating from this disease. The following results were noted in these cases:—

CASE IX.—Private A., aged 19 years, was readmitted to hospital Nov. 19, the chill having reappeared the previous day. He was a tall, undeveloped boy, who had been overworked as a printer, and badly nourished throughout his life. He was much reduced in strength, from frequent attacks of intermittent fever, which yielded but temporarily to the influence of quinia. Symptoms of pulmonary disorder also had begun to present

themselves. He was placed upon a stimulating diet, and efforts were made to unload his bowels. Lugol's solution, $\mathfrak{m}\mathfrak{x}$ to be administered every three hours.

Nov. 21. A fluidrachm of chloroform was administered at 10 A. M., in anticipation of the chill. The sleep produced was profound, and lasted nearly seven hours, no symptom of the chill being perceptible. Early in the night his bowels were opened freely.

23d. By neglect of the attendant, the dose in anticipation was omitted, and at 11 A. M. the chill occurred. Wanting, however, much of the severity of the last attack, it yielded promptly to chloroform.

25th. At 10 A. M., the dose in anticipation having been again administered, he slept two hours; no sign of the chill detected; the patient evidently improved.

27th. Chloroform administered as on the previous day of attack, and with the same results. His bowels have become regular; his kidneys secrete freely, at times excessively; sleeps soundly; the night-sweats with which he had been troubled were much abated.

29th. Chloroform omitted; no recurrence of the paroxysm. The iodine solution was discontinued, and the patient placed upon cod-liver oil, the dose being increased as rapidly as the stomach would allow in recovering its digestive powers.

Under this treatment he remained until Dec. 25, when, being greatly increased in weight and strength, and the disease not returning, all treatment was abandoned, and he was returned to duty.

CASE X.—Private M., aged 20 years; a shoemaker by trade; small and undeveloped; miserably weak and emaciated, weighing only 87 pounds to a height of 5 feet 4 inches. He was admitted for treatment Oct. 1, with chills, from which he had suffered severely for the past two months. He was placed upon quinine sulphas, gr. iij every two hours; a tablespoonful of oleum morrhue in an ounce of whiskey to be taken, also, morning and evening.

Oct. 3. Chill occurred about 4 P. M. Chloroform, $\mathfrak{m}\mathfrak{x}$, procured a sleep of about thirty minutes. He then awoke, with his mind disturbed and alarmed. The dose was at once repeated, producing a profound hypnotic effect, under which the paroxysm disappeared.

5th. An anticipating dose of chloroform relieved him from the expected attack.

7th. Cinchonism becoming evident, the intervals were increased to five hours on the same doses of quinia. Chloroform not to be administered unless symptoms of attack presented themselves.

9th. No paroxysm has occurred; all treatment abandoned, excepting the oil, which was increased in quantity. His appetite became voracious; he consumed large quantities of the oil; improved rapidly in mental and bodily strength and in weight.

31st. The paroxysm, which had been absent since the 9th inst., having recurred at 5 P. M., a drachm of chloroform procured a sleep which lasted through the night. An undue mental excitement ensued, however, as was the case after the dose of the 3d inst.; so that, on awaking in the morning, he remembered many dreams with great distinctness.

Nov. 1. He was ordered Lugol's solution, $\mathfrak{m}\mathfrak{x}$, in a tablespoonful of cod-liver oil, every three hours, which was continued until the 5th. Chloroform, having disturbed the weak mind of the patient with such vivid

pictures, although it controlled the paroxysm, was directed not to be exhibited unless the chill recurred; and, to his great relief, no such necessity occurred.

The oil was continued until the end of the month, when, becoming repulsive to him, it was abandoned. He now weighed $129\frac{1}{2}$, being $14\frac{1}{2}$ pounds more than he had ever attained to prior to enlistment. He is, to all appearance, perfectly well.

It is the experience of the writer that the brain and nervous system are rarely excited to undue action by the exhibition of *chemically pure chloroform*; and that when this cerebral excitement does occur, it will be found to depend more upon the idiosyncrasies of the individual, or the medication to which he has been subjected previously to the use of the chloroform, than upon any peculiar property of the chloroform itself.

But two well-marked cases of such chloroform "intoxication" have come under our observation. They were encountered in hospital at the same time, and were noted as follows:—

CASE XI.—Private O'K., aged 24 years, was admitted Dec. 29, with intermittent fever. The next day the chill recurred at 12.40 P. M., being violently congestive in its character; face livid; skin at shoulders, hips, and extremities becoming rapidly discoloured; pulse thread-like; surface of body clammy. At 12.50 P. M. a fluidrachm of chloroform was administered; and as in ten minutes there was no cessation of the chill, it was repeated. The administration of this dose was followed by an intense excitement, together with, as expressed by the patient, "a cramp in his heart."

The chill and congestion were arrested; but for a time he was in a stage of wild delirium, identical with that produced by alcohol. Gradually the violence of his symptoms decreased, copious emesis ensued, and he lapsed into a quiet state, the delirium, however, continuing when he was aroused. No sleep having been obtained during the day, at 9 P. M. the dose was repeated, again producing some excitement. This rapidly subsided, however, as at 9.20 he was in a sound sleep, which lasted during the night. In the morning his mind was clear and his general condition improved. He has since taken three separate doses of chloroform, neither of which produced any discomfort.

It was suspected that the specimen of chloroform which was first exhibited might have been deleterious from decomposition or impurities, but it satisfactorily answered every test.

CASE XII.—Sergeant P., aged 35 years, admitted Dec. 31, with catarrh, the symptoms of which were marked. He had also been troubled for some time with obstinate constipation.

At 9.30 P. M., for the benefit of its hypnotic effect, a fluidrachm of chloroform was administered; at 9.45 he was exceedingly inebriated, and vomited profusely; at 10 o'clock he had a large and offensive stool; after which it required the assistance of two men to replace him in bed, where he was soon in a sound sleep. On awaking the next day, he presented the appearance and experienced the symptoms of one recovering from a debauch.

Chloroform has since been several times administered in this case; and although the dose was diminished each time, yet in a few moments he exhibited all the symptoms of inebriation.

Since the publication of Dr. Henry Osborn's letter in the *Medical Times and Gazette* for July 7, 1866, the question has been frequently proposed to those interested in the study of this remedy, "Is chloroform cumulative when taken internally?"

In no case under the writer's observation have any symptoms occurred which would warrant such a supposition. He would suggest, further, that the following considerations may possibly answer the question, to some extent, in a satisfactory manner:—

I. The specific gravity and peculiar volatility of chloroform, and its probably consequent penetrative power, would of themselves be likely to prevent its remaining latent in the system, and thus becoming "cumulative" in its operation.

II. The rapidity with which chloroform is eliminated by, or through, the lungs and kidneys must interfere with its accumulation, if not its "cumulative" action.

III. The character of the sleep produced—which is not comatose, like that of an *anæsthetic* or *opiate narcotic*, but natural, and from which the patient can be easily aroused, although lasting, when not interrupted, from one to two or three hours in succession, and then ceasing entirely—would lead us to suppose an evanescent although definite hypnotic action, which may be estimated, in accordance with the doses given, at least as nearly as that of any other of the familiar soporific draughts.

ART IV.—*Ether in Laryngitis with Exudation of Lymph.*

By R. R. LIVINGSTON, M. D., of Plattsmouth, Nebraska.

In the number of this Journal for April, 1866, Dr. John J. Black, of Philadelphia, Pa., called attention to the efficacy of ether as a local application in aphthæ, and suggested the strong probability of its proving beneficial in diphtheria. In the *Nashville Journal of Medicine and Surgery*, for October, 1866, some cases of capillary bronchitis treated with inhalations of ether are related by Dr. W. Y. Gadberry, of Lexington, Miss.

My attention having been thus directed towards ether as a remedy for exudative products, I determined to test its usefulness when the occasion offered; but it was not until the 4th of January last that an opportunity presented, and I relate the case as it occurred.

I was called at 3 o'clock P. M. to N. W., æt. 2, the messenger informing me the little girl had "croup," and was dying. Previous to my arrival the mother had administered a full dose of syr. scillæ, and I found the child vomiting and purging freely. Pulse 150; tongue slightly coated, somewhat swollen and red; fauces red with an engorged appearance;

tonsils slightly swollen; considerable tenderness over the larynx; eyes watery; breathing slightly stridulous, the mother stating that previous to emesis it was very laboured, or, as she expressed it, "the child was choking;" countenance expressive of great anxiety; and though no coughing occurred at the time of my visit, I was informed she had coughed repeatedly with a "ringing, croupy cough."

I directed inhalations of lime-water, as hot as the child could bear them, after the manner of M. Biermer, of the University of Bern, as reported in this Journal for October, 1865; also R.—Hyd. chlor. mit. gr. x; antim. et pot. tart. gr. j; ammoniæ hydrochlor. ʒj. M. et ft. chart. no. xij, one every two hours. I instructed Mrs. W. to keep a large, open kettle of water boiling on the stove for the purpose of moistening the atmosphere. Not considering the child in immediate danger, I left the house, requesting the mother to send for me in the event that the symptoms should grow worse during the night.

About midnight I received a most urgent request to visit the child immediately, as she was suffocating. On arriving at the house, and before entering the child's room, I was struck with the loud, wheezing noise of her respiration, and the loud, ringing cough so peculiar to the disease under consideration—the tussis clangosa of Cullen, which, when once heard, is never forgotten. I found my little patient suffering from great dyspnoea; respiration performed with difficulty; nostrils dilated; muscles of chest and neck violently exerted; lips livid, and head thrown backwards, with great restlessness, and a slightly cyanosed appearance of the countenance. On inquiry I was informed that the lime-water inhalations afforded temporary relief, but that each time they were left off the difficulty of breathing in a short time recurred. The prognosis was evidently bad, and deeming it my duty to apprise the parents of the dernier resort in such cases, communicated the opinion I entertained, and while holding out tracheotomy as a sole hope, could give but little encouragement of its proving effectual in saving the child's life.

Fortunately, at this critical moment, the suggestions of Drs. Black and Gadberry, mentioned above, occurred to me, and immediately dispatching a friend to the nearest drug store, I procured a small parcel of Squibb's ether, and though extremely sceptical as to the result, at once proceeded to administer it by inhalation according to the directions of Dr. Lente, as reported by Dr. Packard in this Journal for January, 1866, premising the inhalation by exhibiting one-half teaspoonful internally, which, as I anticipated, was swallowed with difficulty, and caused a severe paroxysm of coughing.

In precisely eight minutes from the time the patient commenced the inhalation, the abnormal muscular exertion ceased; a general relaxation took place; the pulse fell to 100; and the peculiar "flip" sound of partially detached membrane was distinctly heard during expiration; the loud wheezing noise of the breathing abated, and in thirteen minutes the child was sleeping in comparative ease. In about ten minutes more she coughed; not with the loud, ringing, metallic sound so peculiar to this affection, but with that moist rale which every practitioner hails as the harbinger of success in the treatment of this dreadful malady. The coughing was followed by efforts at vomiting, and to my inexpressible relief numerous portions of membrane were discharged, the edges having a whitish, and the centres a grayish appearance; they were oblong in shape, from an eighth to three-fourths of an inch in length, and from half a line to a line in thickness. A few times

more, at short intervals, coughing occurred, followed by emesis and the expulsion of additional portions of membrane. The vomiting now ceased, and the child slept almost naturally, the respiration being normal. Her sleep was frequently disturbed by short fits of coughing; but the intervals of rest increased in duration, and no more membrane was expelled, though it was evident that she occasionally swallowed portions without completely awakening. At 4 o'clock A. M. the child was so much better that I left, not, however, before the sunshine of hope had made the mother's heart radiant with gratitude. On my return that morning, about 10 o'clock, the child was awake—playful; and the only trace of her late imminent danger was a slight hoarseness. Since then she has entirely recovered.

This case I acknowledge does not unequivocally confirm Dr. Black's opinion of the probable utility of ether in exudative products. The well-known efficacy of the powders used and the inhalations of lime-water, it is true, have a tendency to invalidate the claims of ether as *the* proper remedy which successfully restored the child to health. When, however, it is borne in mind that the nebulized lime-water could not fail of being, to a great extent, carbonated by inhalation, from its well-known affinity for carbonic acid, and thus in a great measure be rendered inoperative, I am free to confess that the temporary relief experienced by my little patient during its administration seems attributable more to the warm moisture of the atomized water than the lime. Again, the laboured respiration returned shortly after the inhalations of lime-water were temporarily discontinued, and its behaviour partook more of the character of a palliative than a curative agent. For these reasons I do not attribute the recovery of the child to the lime-water inhalations, nor yet to the powders used, for no really marked benefit was derived from them; and it was not until the ether was exhibited that any positive change for the better occurred. For these reasons, and the almost magical effect produced under my immediate observation, I have no hesitancy whatever in ascribing this little patient's recovery to the ether.

What the action of the ether was in this case is a question fraught with interest. I incline to the opinion that more or less fatty matter must exist in the exudations, and that this substance being readily acted on, a disintegration of the membrane resulted. Certainly the form of the expelled portions gives evidence of a fibrillated structure; but we all know that even in its most perfect condition, lymph will degenerate if the process of organization is not such as to maintain vitality, and it is now pretty well settled that this degeneration is of a fatty character. Corroborative testimony of the usefulness of ether in these abnormal deposits, I am well satisfied, can be obtained if the remedy receives a trial. The effects in the case I have given were most happy, and if it proves as efficient in the hands of other practitioners as it did in mine, many a maternal heart will be gladdened when hope has almost died within it.

ART. V.—*A Brief Description of what appears to be Two Newly-Discovered Skin Diseases; one originating in the Cat and the other in the Dog. Both Cryptogamic and Contagious, and both capable of being transmitted from the Animal to the Human Body.* By J. H. SALISBURY, M D, Prof. of Histology, Physiology, and Cell Pathology, in Charity Hospital Medical College, Cleveland, Ohio. (With three wood-cuts.)

I. *Trichosis Felinis*.—This is a skin disease originating in the cat, and readily transmissible to the human subject. It resembles in appearance trichosis furfuraceæ, and, like it, has a cryptogamic cause. It is produced by a species of fungus that develops in the fermentation of cat's milk. It develops on kittens while nursing; first around the lips, nose, face, and eyes, and spreads to the head and body. It forms, with the epidermic cells, circular patches of thin rusty scurf on the face, nose, lips, and head. The hair soon sickens, curls up, dies, and crumbles away, and the eyes become sore and gradually close. Often the eyes become entirely shut. After nursing ceases this growth gradually disappears. It often lasts, however, two or three months, and may be longer, after weaning.

This disease is contagious, and is readily transmissible to the human subject from the kitten, and from one person to another. It is contracted more readily by young children than by grown persons, yet it is readily contracted at all ages. On infants and young children it spreads rapidly, attacking all parts of the body alike. It spreads rather more rapidly on the hairy than on other parts of the body. The plants attack the hair follicles, in which they develop luxuriantly, sending off branches abundantly through the epidermic and cuticular layers. The spores and filaments of this mucedinous growth resemble those of *Trichosis furfuraceæ*. They however develop much more rapidly on the human body, causing the disease to spread in isolated patches to all parts of the surface often in a few days' time.

The patches on the scalp do not differ materially from those of ordinary *Trichosis furfuraceæ*, save that the surface is, perhaps, slightly more raised and inflamed, and produce more irritation. On parts of the body not covered with hair they spread less rapidly, starting from a single point or hair follicle and extending in all directions, forming circular and oval patches of greater or less size. The patches are slightly elevated above the surrounding surface, red, and covered with scales and little elevations marking the position of the hair follicles. The colour of the patches is deeper and the irritation and itching more severe than in ordinary *Trichosis*.

In less than a week after a kitten affected with this disease comes in contact with a child the eruption begins to show itself upon some parts of the surface of the latter, usually about the hands, arms, and face, especially if the child has been caressing the kitten. Soon after patches appear on the limbs and body and rapidly spread, producing an intolerable itching,

which is only partially relieved by rubbing and scratching the patches. This is purely a local disease, it being contracted alike readily by the healthy and diseased.

Pathology.—The cells of the hair-follicles and of the epidermic layer between them are shrunken and shrivelled, and the hairs, diminished in size, become brittle, and break off and crumble away. The deeper parts of these follicles become enlarged often, and the hairs die, shrink, and fall out.

The capillary vessels in the papillary layer of the skin beneath the diseased surface become congested and enlarged, producing a reddening of the skin and a slight elevation of the diseased surface. The epidermic cells of the follicles and plane surfaces are robbed of their nourishment, become diseased and shrivelled, and finally die and fall off in dry scales. Frequently the irritation is so great that pus is formed in little vesicles, which become broken by scratching.

Cause.—The cause is purely local, and has nothing necessarily to do with constitutional derangement. It is simply a fungus, a mucedinous growth, that develops primarily in the epidermic cells saturated with the fermenting milk of the cat, which, during nursing, becomes smeared over the faces of the kittens. It does not appear to be readily transmitted from the kittens to the old cat. It does not appear, so far as at present traced, to be a disease prevailing to any great extent among cats, save during the period of nursing, and from one to three months succeeding. This plant is unlike the species that develops in human milk. For the purpose of distinguishing it I have given it the specific name, *Felinis*. This fungus finds a fit soil for its growth in the skin of persons of all ages. The cells of the epidermis, however, of the young are more tender and better supplied with nourishment than those of the mature and old. Hence this disease more readily attacks, and more rapidly spreads over the surface of the former.

In ordinary ringworm (*Trichosis furfuracea*), the fungoid cause exists mostly in the spore state. The plant does not advance beyond its cell condition. Its growth seems to be confined simply to cell multiplication by pullulation. In this disease the plant cells multiply by pullulation, and these advance to the filamentous stage of growth. These filaments are found running through among the cells of the epidermic layer.

Treatment.—This being a disease produced by a cryptogamic cause, any substance which retards the growth of, or destroys this kind of vegetation, becomes a more or less useful remedy. Among the agents of this class may be mentioned tr. ferri chloridi; tr. iodini; dilute sulphuric acid; dilute nitric acid; dilute hydrochloric acid; dilute nitro-muriatic acid; ointment of the per nitrate of mercury; dilute ointment of per nitrate of mercury, made with cod-liver oil; creasote; solutions of sulphurous acid; solutions of soluble sulphites; strong solutions of quinia, etc. In short, all anti-fermentative substances; or, all those bodies that prevent yeast from ex-

citing fermentation in saccharine and farinaceous materials, or that tend to prevent animal tissues from undergoing fermentative changes, become useful remedial agents in diseases caused by parasitic fungi. Under ordinary circumstances this plant, probably, will not grow upon the healthy body. It is quite likely that it only becomes capable of developing in such situations, after becoming animalized—so to speak—by developing either in the dirty or milk-smearred and saturated epithelial tissues of the cat.

One of the most ready remedies for perfectly eradicating this eruption is the *tr. ferri chloridi*. This should be painted over the eruption. A single thorough application will most generally destroy completely the vegetation and effect a cure. The application of *tr. ferri* is attended with considerable pain, in persons of thin and tender skin. When the patient is not willing to endure the smarting of this remedy, others of a milder character may be substituted. On young children, the oint. of the per nit. of mercury, made with cod-liver oil and the dilute citrine ointment, will be found excellent remedies. The mineral acids, when used, should be sufficiently diluted, so as not to canterize, or produce too much irritation. They may be painted freely over the diseased surfaces morning and evening. A few days' application will suffice to effect a radical cure.

II. *Trichosis Caninis*.—This is a skin disease, affecting dogs. The eruption begins by a small pustular elevation, covered with epithelial scales; other little pustules appear around this, and beyond these others soon arise. In this way the disease gradually extends in all directions from the starting-point, from follicle to follicle, producing circular and oval patches elevated above the surrounding healthy surface about one line, and covered with dry epithelial scales, rolled and twisted up. The patches extend, and have a shape like that of *trichosis furfuracea*, on the human subject. Like the last-named disease, this is cryptogamic. It is produced by a parasitic mucedinous growth, which develops among the epithelial cells of the epidermis, passing down among the cells of the hair, sweat, and fat follicles of the skin, depriving them of nourishment. This causes them to sicken, shrivel and dry up, die, become detached and fall off in dry scales. The cells from which the hair is supplied with food and cell elements becoming diseased, the hair becomes imperfectly nourished, shrivels up, dies, and falls from the follicles. This disease attacks all parts of the surface of the dog. Young dogs are more susceptible to it than old ones; yet no age is exempt. It resembles closely the *trichosis felinis* of kittens; but appears to differ from it in this particular, to wit: that the fungus appears more luxuriant, large, and is more confined to its filamentous stage of development. It attacks less the hair follicles than the felinis, and extends more generally to all parts of the epidermic cell surfaces.

These diseases may, however, be both produced by the same specific cause, the difference arising mainly from the difference in the animal cell surfaces in which they are developed. On account of this and other

characteristics, I have designated these diseases by two distinct names. The development of these two growths, to their fruiting stage, will alone settle the question as to the identity or difference of the cause in these two diseases. This part of the investigation is now in progress, and I hope to soon be able to say positively whether there is or is not a difference as to cause between these diseases.

Pathology.—The cells of the epidermis, deprived of their normal nourishment, become shrivelled, dry, and smaller in size, and separate from each other to a greater or less degree. This drying and separation of the cells causes the diseased surfaces to rise above the surrounding healthy parts, the dead, dried, and curled-up cells separate and fall off, presenting a bran-like appearance. The cells of the hair follicles are affected in the same way as the plane surfaces; the hairs sicken, become small and shrivelled, die, and fall from their follicles, leaving the surface bare and inflamed.

Cause.—This is purely a local disease, produced by the development of the cells and mycelium of a mucedinous fungus among the cells of the epidermic layer of the skin. The mycelium is found developing more abundantly than the cells. The mycelium sends out filaments in all directions, branching and rebranching, forming a close network in the cell layer. As the fungoid filaments extend in all directions from the starting-point the disease extends. The development of this fungus deprives the epidermic cells both of the plane surfaces and the follicles of their nourishment. This causes them to sicken, die, shrivel up, separate and exfoliate.

Treatment.—This disease is readily cured by the application of the tr. ferri chloridi. A few applications suffice. One application each day is sufficient. After several applications of the tincture it may be well to apply the dilute citrine ointment morning and evening, till the surfaces become soft and healthy. The mineral acids, the soluble sulphites, creasote, and all anti-fermentative substances, are curative agents in this disease.

This disease is transmissible to the human subject; but, so far as examinations and investigations have at present gone, it is much less readily communicable than the *trichosis felinis*. It is much more readily transplanted upon children than upon the mature and old.

It attacks all parts of the body alike readily. It usually, however, first attacks the hands, arms, and face; other parts of the body being more or less protected with clothing.

History of Investigations.—Without troubling the reader with the tedious details of the investigation, I will here briefly state that this disease was first noticed by myself to be peculiar in the summer of 1864, while treating it in an orphan asylum, where some thirty small boys were affected with it. During the following year quite a number of cases of the disease were under my care. It was not, however, till July and August, 1866, that I commenced studying the disease with the view of tracing its source.

I had noticed that in most families where it prevailed the children

were playing with kittens that had diseased faces. On comparing the mucedinous growth on the kittens with that on the diseased children, they were found to be apparently identical in the shape of the spores, and in the arrangement of the epidermic cells. My next experiment was to procure a number of diseased kittens, and distribute them to families where there were no cats and where the children were all free from the disease. In every instance, in from five to ten days after the children began playing with the diseased kittens, they commenced breaking out with this eruption. The next step was to inoculate myself with the spores of this fungus from the cat. In about three days they began to develop rapidly, and send out filaments in all directions among the epidermic cells, producing a disagreeable itching, and forming circular and oval patches of eruption precisely like the disease previously described. The eruption yielded readily to treatment.

I now inoculated myself with the spores from the patches of eruption on a healthy child, to whom I had given, about two weeks before, a diseased kitten. The characteristic eruption followed, extending in all directions from the points of inoculation. Many other experiments were made, connected with the disease, both on the cat and dog, a detail of which would be here uninteresting and unnecessary.

Without further comment or apology this brief description is offered to the profession, hoping the subject may be of sufficient interest to induce others to make investigations in the same direction.

Fig. 1.



Fig. 2.

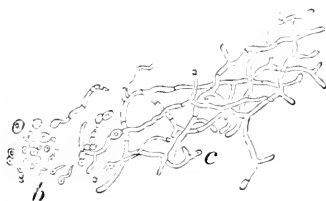


Fig. 3.

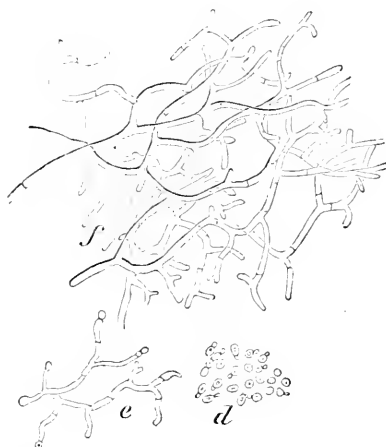


Fig. 1.—a. The spores of the *trichosis felinis* in cats.

Fig. 2.—b. The spores in the same disease in children. c. The mycelium of the fungus as it appears running about among the epidermic cells on the face of a kitten. This appearance and arrangement of the mycelium does not differ from that seen in the disease in the human subject.

Fig. 3.—d. The spores of the fungus producing trichosis caninis in dogs. Many of the spores are seen to be slightly polyhedral. e. The early development of the mycelium from the spores. f. The mycelium running among the epidermic cells in patches of trichosis caninis on dogs. It presents a similar appearance when growing among the human epidermic cells.

ART. VI.—*The Ophthalmoscope as a Help to Diagnosis of Brain Disease.* By HENRY D. NOYES, M.D., Surgeon to New York Eye and Ear Infirmary, Professor of Ophthalmology in Bellevue Hospital Medical College.

THE connection between cerebral disease and injury to sight has long been recognized. The precise mode of connection has not been fully understood, because in pre-ophthalmoscopic times the lesions could be observed only when autopsies were made. Even then not always were the optic nerves and retinæ examined, because their morbid processes were esteemed of subordinate importance, and it was assumed that the loss of sight was produced by simple paralysis of the optic nerves, in a manner similar to paralysis of nerves going to voluntary muscles.

It has ever been an important point in cases of brain disease to inquire into the condition of the eyes and of sight, and valuable information has been thus afforded. It has been customary to look for strabismus, for changes in the pupil, and for impairment of vision. But the nerves supplying the ocular muscles may entirely escape injury; the pupil, too, is often wholly unaffected, and, when paralyzed, becomes so chiefly through the medium of the sympathetic nerves.

The function of sight has seldom been properly investigated. In the first place, suitable test types, such as those of Snellen, Jäger, &c., are far from being in general use. Even when care is used, with or without these tests, the condition of eccentric vision is almost never examined. The importance of doing so will be seen when it is remembered that, in going to the peripheral parts of the retina, the optic nerve fibres have to travel a greater distance than to its central portions, and, being more remote from the cerebrum, are likely to be first to suffer. The exploration of the visual field is very easily done by making the patient close one eye and with the other look the observer in the face, who holds up his hand at the side, above, and below, and ascertains whether the patient is able to count fingers or notice the movement of the hand, when he can see it only by indirect vision. Important information is often to be thus elicited.

Since the employment of the ophthalmoscope pathological changes within the eye have been accurately classified. We can easily recognize and observe retinitis, acute and chronic, also neuritis optica. Atrophy of the optic nerve and retina are frequent causes of blindness. Many cases of loss of sight have been noted resulting from diseases of the intra-ocular bloodvessels, such as apoplexies of the retina, embolism of the arteria centralis retinæ, hemorrhage into the sheath of the optic nerve, and by hyperæmia as well as ischæmia of the retina.

It is important to state that inflammation and atrophy of the optic

nerves and retinae often take place as exclusively local affections, and do not imply trouble in other parts of the nervous system.

When, however, disease of the brain or of the spinal cord does cause loss of sight, there must be physical lesions capable of being appreciated, and since intra-ocular phenomena can be so thoroughly scrutinized by the ophthalmoscope, we have no excuse for neglecting to observe them. They cannot be void of interest, and they may give us important help.

But we cannot put off inspection of the interior of the eye until loss of sight shall have declared itself. The early period of hyperæmia is of far more importance to the welfare of the patient than a later stage, when other signs may have elucidated the diagnosis, but belong to a morbid condition much less controllable by treatment. At this hyperæmic stage, we would not anticipate much or any loss of sight; therefore it behooves us to look for ourselves. Another most remarkable fact compels us to use the ophthalmoscope when no complaint has been made of dimness of sight—there may exist an advanced and strongly pronounced degree of neuro-retinitis, the result of brain disease, and cause only insignificant injury to sight. This statement appears paradoxical, but I have had opportunity of verifying it in the most positive manner.

A case in which Dr. Benedict, of Vienna, had diagnosticated disease of the cerebellum, was, in accordance with his invariable custom, submitted to examination by the ophthalmoscope. The patient's vision, by Snellen's types, was equal to 1; visual fields of normal extent; pupils active; no strabismus. The optic nerves were found congested, infiltrated, markedly elevated by swelling, and dotted by minute ecchymoses; the border of the disks ill defined; the retina also infiltrated, swollen, and containing patches of plastic exudation; the retinal vessels turgid.

I had the opportunity of observing this case, by the kindness of Dr. Benedict, and inspected the fundus oculi with great care, both by the direct and indirect method of ophthalmoscopic examination. The diagnosis was fully sustained by all who saw the case in Prof. Arlt's Ophthalmic Clinic, and there could be no doubt, from a number of symptoms, that the patient had a chronic brain disease; he had severe headache, memory impaired, gait unsteady, &c.

I find this surprising discrepancy between the physical and functional condition of the nerve and retina under these circumstances alluded to in an abstract of seven cases of neuro-retinitis from brain disease, published in the *St. Petersburg Med. Zeitschrift*, Bd. x., 1866, by Dr. Blesig, and quoted in *Klinische Monatsblätter für Augenheilkunde*, Aug. 1866, p. 273. One patient remained a half year under observation without any change in the state of the fundus oculi or in the degree of vision, there being neuro-retinitis as described above with vision = 1.

Based upon these facts the argument for making ophthalmoscopic examination in all cases of brain disease becomes irresistible. Indeed, a

moment's reflection would lead to this conclusion, without any considerations drawn from pathology. The optic nerve is only an outlying portion of the brain; its extremity is fully exposed to view. Situated within about two inches of the brain, it is the only nerve in the body which we can inspect; it contains bloodvessels which communicate directly with the intracranial circulation. We thus come into relation with the cerebrum by continuity of nerve structure and also of bloodvessels. The course of the optic tracts at the base of the brain in contact with the base of the skull, renders them very liable to interference from the growth of tumours, and from local meningitis or periostitis, diseases which take place in this part of the cranium more frequently than in any other. So, too, intra-cerebral processes and diseases of the spinal cord influence the optic tracts by their relations with the corpora quadrigemina. I must also not omit to allude to the situation of the internal carotid artery, and of the great cavernous sinus in the closest vicinity to the foramen opticum. It is almost impossible for these great conduits to be surcharged, without causing congestion of the arteria and vena centralis retinae, the former coming by the ophthalmic from the carotid artery, the latter emptying into the cavernous sinus.

While strenuously urging the importance in all cases of brain disease of making examination of the interior of the eye, I must in fairness state that in many morbid conditions of the brain there will be no lesion of the optic nerves; but at this no one will be surprised. On the other hand, the inspection of the optic nerves must be fairly made. The usual method of examination by the indirect method with a two inch objective is wholly inadequate to detect incipient morbid changes—even with an objective of three inches focus, aided by a ten inch lens behind the mirror, the amplifying power is not sufficient. It is far better to use the direct method, bringing the mirror close to the eye, and, if need be, correcting the observer's or patient's error of refraction by a proper lens, and it is also better to secure a moderate dilation of the pupil. It is hardly worth while to assert that ophthalmoscopic examination with proper care can do no harm to the patient—the notion of its pernicious influence on sight, except where there is a high degree of intolerance of light, has long ago been exploded. If a patient be unable to sit up, by bolstering with pillows, it is easy to put him in a posture convenient for examination. The room need not be utterly darkened, and a kerosene lamp will suffice.

A convenient instrument for hospital use, where a large ward can be only very imperfectly darkened, has been contrived by Galezowski. The objective and mirror are contained in a draw-tube, to be held in the hand, and the end supported on the patient's brow. The image being formed within the tube is not interfered with by surrounding light. It is, however, possible to employ with this instrument only the inverted image.

In estimating the diagnostic value of intra-ocular appearances, I would

not make too much of my subject. When lesions are found in the eye, there may coexist other symptoms which have rendered the diagnosis perfectly clear, and the ophthalmoscope may be unnecessary, but it gives confirmation and strength to the medical opinion, and in the scientific view it ought not to be undervalued.

But every practitioner knows that brain diseases are often exceedingly obscure; and these cases are of various kinds, such as the growth of tumours, subacute and chronic meningitis, commencing hydrocephalus, chronic and acute softening, etc. It is under these circumstances that the physician will be glad to get any help in diagnosis, and he may obtain it by the ophthalmoscope. He may get a positive assurance that there is intra-cranial disorder without being able to state its exact nature, but this assurance will be of the highest value in deciding his treatment, and in relieving his own mind of harassing perplexity.

We are not yet able to infer the nature of the intra-cranial disorder in view of the phenomena of the optic nerve and retina, with certainty; in some instances we can get a high degree of probability. But the subject is yet far from being fully developed; we have to make many more ophthalmoscopic observations and autopsies before we shall reach this degree of accuracy of diagnosis. In Bright's disease we can now infer with tolerable certainty the state of the kidney from the chemical and microscopic examination of the urine; but this inquiry was begun thirty-five years ago. It is scarcely five years since the line of investigation now under discussion was fairly begun. Already two treatises have appeared in France, viz: "*Etude Ophthalmoscopique sur les Altérations du Nerf Optique et sur les Maladies cérébrales dont elles dependent*, par X. GALEZOWSKI. Paris, 1866. pp. 179," and "*Du diagnostic des Maladies du Système par l'Ophthalmoscope*, par E. BOUCHUT. Paris, 1866. pp. 503." In various ophthalmic journals cases are recorded, and there is great activity in pursuing these studies.

Among the diseases in which he has made ophthalmoscopic inspection and found lesions more or less frequently, Bouchut enumerates meningitis, acute and chronic, tumours, abscess, hydrocephalus, phlebitis of the sinuses, epilepsy, insanity, delirium tremens, febrile delirium, locomotor ataxy, softening, and apoplexy. Out of thirty cases of cerebral hemorrhage, in nineteen there were marked changes observable with the ophthalmoscope.

The lesions which may be seen are as follows:—

In the optic nerve capillary hyperæmia and loss of transparency of its structure. (It is not easy to decide what tint of redness in a given case shall be considered morbid, because the complexion of the optic nerve varies about as much as the complexion of people's faces. It is only the deepest tints which can be asserted to be evidences of disease, unless there has been previous opportunity for examination, or the other eye presents a different and healthy appearance.) The nerve becomes infiltrated, its outlines lose

distinctness, and the bundles of fibres become visible in delicate lines radiating into the surrounding retina. The nerve becomes swollen and elevated to a prominent papilla. This has been most frequently noticed in cerebral tumours.

In the retina there will be similar appearances, turgidity, varicosity of vessels, serous transudation, exudation of yellowish plastic lymph—either in patches or in specks, and ecchymoses.

(It is sometimes difficult to discriminate the lesions of the retina which belong to Bright's disease from those now under consideration. The best evidence is perhaps the peculiar glistening lustre and refractive qualities of the minute specks of fatty degeneration found in Bright's disease. But on this point we must still speak cautiously.)

Besides the inflammatory states, the condition of atrophy occurs both as a primary lesion and as the usual sequence of neuro-retinitis. As a primary lesion it accompanies chronic disease both of the brain and spinal cord. When ensuing after inflammation of the nerve or retina it sometimes comes on very soon after the beginning of the disease. In the atrophy which succeeds neuritis the margin of the disk is for some time ragged, and, though discernible, shades with the surrounding tissue. Its colour is a light gray or dirty white. In primary atrophy the limit of the nerve is strongly marked, and its colour is an intense dead white. After the lapse of months the appearances in the first case change to those of the second, and it is impossible to assert what may have been the original disease.

Less frequently than the above we find embolus of the arteria centralis, or of the vein, and ischemia. Occasionally acute glaucoma comes on in consequence of cerebral trouble. Of this I shall speak again.

We are not yet in position to trace the intra-ocular lesions to their exact cause; that is, to say what kind of cerebral disease they indicate. A number of cases have been reported in which cerebral tumours produced neuro-retinitis with swelling and infiltration of the papilla. See *Archiv für Ophthalmologie*, bd. xii. abth. ii. 114. Also *Ibid.*, bd. vii. ab. ii. 74. *Ophthalmic Hospital Reports*, vol. v. part i. page 94, and part ii. page 163. *Ibid.*, vol. v. part iii. page 177. *Klinische Monatsblätter für Augenheilkunde*, vol. iv., June and July, page 164. *Ibid.*, vol. iii., March and April, page 121. *Ibid.*, vol. iv., August, page 275. See also *Sitzungsbericht der Ophthalmologischen Gesellschaft* for 1864, page 74. The last allusion describes a case of entozoon in the brain, causing neuro-retinitis and other symptoms.

This form of inflammation is called neuritis descendens, to indicate its connections. It is supposed to imply increase in the pressure of the intracranial mass. It has been found to result both from encephalitis and from tumours. It may be communicated along the course of the bloodvessels—that is, in consequence of vascular disturbance—or by a morbid process going down the sheath of the nerve and the inter-fibrillar connective tissue.

In many instances nothing can be found in the optic nerve save an undue amount of connective tissue and nuclei, while at the point where the nerve penetrates the sclera, œdema, redness, and swelling appear. This would appear to be caused by strangulation of the nerve in the porus opticus, this unyielding orifice acting, as Graefe remarks, as a "multiplier" of the inflammatory process. The fact has been several times observed, and is a very interesting pathological phenomenon.

The case of continuous orbital neuritis optica and peri-neuritis is thought to be more frequently associated with simple meningitis, not depending on tumours. On the other hand, and showing the need of future careful observations, white atrophy sometimes follows from the growth of tumours without precedent neuritis.

A very interesting case of intra-cranial tumour continuous with a malignant growth in the orbit, is given in *Archiv für Ophthalmologie*, bd. xii. abth. ii. page 100. The orbital disease was in the left side—the intra-cranial tumour commenced on the same side, but crowded over to the right and completely swallowed up the right optic nerve and the chiasm. Prof. Virchow was unable to find any trace of either in the mass. Yet vision of that eye was perfect, and the fundus oculi normal. Death took place from meningitis.

Another case of general surgical interest is given in the same journal (Bd. xii. abth. i. page 1), where fracture of the supra-orbital plate occurred and gave rise to neuro-retinitis, and also meningitis. The symptoms came on three weeks after the injury, and while other symptoms pointed to inflammation of the brain, the fundus oculi gave a striking picture resembling the intra-cranial process.

A most interesting and elaborate paper on this subject is in *Ophthalmic Hospital Reports*, vol. iv. part iv. page 389, by Dr. Hughlings Jackson; it is the best which has yet appeared in English.

My purpose has been to draw to this subject the attention of the profession in this country, and to persuade them to take in hand the ophthalmoscope as an important aid in diagnosis. So important is it that no hospital should be without the instrument, and some one or more of its medical attendants ought to take the pains to learn to use it. Men who study the microscope can quickly master the optical principles of the ophthalmoscope, and a moderate experience will teach them the principal lesions to be observed.

I will conclude this paper by relating a few cases illustrating the foregoing remarks:—

CASE I. *Hyperæmia of retina and of the base of the brain.*—Oct. 6, 1866, Mr. T. B. S. J., æt. 17, N. Y., has for many years suffered severely from headache, which rarely entirely ceased, and frequently occurred in extreme severity. Many times sleep has been on this account impossible. Attendance upon school has been very irregular; mental effort would in-

crease the headache. Five years ago had two attacks of wry-neck, one of which lasted six months; besides this spasmodic contraction of the sternomastoid, has had no other muscular disturbance. Has no marked paralysis; had no twitchings nor convulsions; bowels regular; no nausea. Intelligence and memory good. During four months, about two years ago, was free from headache, but afterwards it returned with renewed intensity. For five years has had great difficulty in reading, because the effort gave his eyes so much pain. His vision has been clear until within four months, and now a thin cloud obscures it, both for distant and near objects. Has occasionally had diplopia. His evident insufficiency of internal recti muscles. Is uncomfortably sensitive to light.

Vision tested by Snellen's types, is as follows: Right, $\frac{20}{20}$; left, $\frac{20}{20}$; refraction, both emmetropic; visual field, right normal; left contracted below, and fixation very painful.

By ophthalmoscope, right, nerve disk well defined; edge of choroid decidedly pigmented; capillary hyperemia very marked; slight physiological excavation; retinal veins full; arteries small; no infiltration of retina; no other lesions. Left eye presents same appearances.

In consideration of the long duration of symptoms—and that in spite of skilful and persevering treatment—fearing, as I did, some organic change might be going on in the nervous centres, of which the eye trouble might be only a part—I determined to give my patient the benefit of a consultation with Dr. Brown-Sequard. I gave him a note to the doctor, who sent in reply the following:—

"*Dear Dr.:*—Your patient has been suffering for a great many years (since he was only four years old) from congestion in the base of the brain and in the meninges, and has no organic affection of the nervous centres. All his symptoms, in fact, are due to the very same thing which you have noticed in his retina, *i. e.* hyperemia. This congestion in the base of the brain has gone far enough or lasted long enough to produce a slight paralysis of motion of the left limbs and a slight anesthesia of these limbs and of the left side of the face.

"I do think that he will have a good chance of being better, if not of being cured, by the following means of treatment. First, the application of ice on the spine (between the shoulders) every other day. Secondly, the use of the two ointments for which I inclose a prescription. Thirdly, the introduction of atropine put up in gelatine disks, between the eyelids every day. This mode of treatment I have found to be most useful in a large number of the eye connected with hyperemia of the retina. Fourthly, I would propose his taking the mixture prescribed for a period of about two months. I give him other rules of which he will speak to you.

I am, dear Dr., with great regard,

Yours sincerely, C. L. BROWN-SEQUARD."

It will be observed that to Dr. Brown-Sequard's other methods of appreciation the existence of slight paralysis of motion and sensation became known. The treatment actually pursued was the application of ice between the shoulders for fifteen minutes every second night, and done only four times, because it was painful, and the patient caught cold. The ointments were, *R.* Aconitinae, gr. $\frac{1}{2}$; veratriæ, gr. $\frac{1}{2}$; adipis, \mathfrak{ss} ; also, *R.* Aconitinae, gr. $\frac{1}{2}$; adipis, \mathfrak{ss} . The first of these to be used night and morning on the forehead, the second on occasion of more severe paroxysm of headache. The atropia was not employed. The mixture was as follows: *R.* Ammonii bromidi, \mathfrak{ss} ; ammonii iodidi, \mathfrak{ss} ; ammonia sesquicarb. \mathfrak{ss} ; infus. calumbæ, \mathfrak{ss} . A teaspoonful twice a day, before meals, with a little water.

The second time after using the ice the headache began to abate.

Twelve days after beginning the treatment my notes state: Headache much diminished; able to read fifteen minutes. Vision, right $\frac{2}{3}$ °, left $\frac{2}{3}$ °. Improvement continued without interruption. He was not allowed to read; but felt able to do so. On Dec. 6th, when he was regarded as cured, the notes are: No pain in head or eyes, reads and writes without any trouble, for several hours. Is no longer sensitive to light. Vision, right $\frac{2}{3}$ °, left $\frac{2}{3}$ °. By ophthalmoscope, both optic nerves have the normal hue, retinal vessels their natural size.

The above case was to me highly instructive, not only in diagnosis, but especially in treatment. I am happy to acknowledge my indebtedness to Dr. Brown-Séquard. As to the value of the ophthalmoscope, it gave distinct visible evidence of the morbid process in the brain, which had embittered this young man's life, disqualifying him from entering upon any business. It is true, this disease declared itself by other signs, but the optic hyperæmia was certainly of no small value in strengthening the diagnosis. The success of the treatment was also in the highest degree gratifying.

CASE II. A man about 35 was suffering from a moderately severe attack of delirium tremens. His urine contained albumen; he had not slept for three nights; pulse 80, and irregular. I made examination with the ophthalmoscope, and found in both optic nerves a high degree of capillary hyperæmia and turgescence of the retinal arteries and veins. There was, however, no effusion into the retina, nor into the optic nerve. It is probable that this form of delirium is accompanied by fulness of the vessels of the brain, and that the state of the optic nerves indicated it.

CASE III. A lady about 50, having slight paralysis of the right arm, which had come on suddenly, unable to articulate distinctly, mind confused. The ophthalmoscope did not detect any lesions which could be connected with the supposed cerebral trouble.

CASE IV. A girl about 25, with paralysis of one side of the body, which had existed several months. Nothing morbid could be seen with the ophthalmoscope.

CASE V. A woman about 50, with complete paralysis of one side, including the tongue and face. The diagnosis of cerebral hemorrhage had been made, and was confirmed by the ophthalmoscope. The optic nerve was intensely congested, and so were the retinal vessels. It was difficult to distinguish the outline of the optic disk, from the surrounding red fundus.

I have introduced the last three cases, to illustrate how sometimes nothing can be seen in the eye to aid in diagnosis, and, again, strong confirmatory testimony can be obtained.

In cases of paralysis, the absence of ocular signs has a value in this respect. It signifies, either that the cerebral mischief is acute softening, or a *small* clot, or a clot situated remote from the optic tracts.

I will now relate a case, in which the ophthalmoscope was not simply accessory to the diagnosis, but gave the only positive diagnostic signs, and in which no other testimony was considered by able practitioners deserving of trust.

CASE VI. Acute glaucoma, cerebral apoplexies, and softening.—Mr. C., æt. 59, shoemaker, N. Y., of strictly temperate and correct habits, and, until within two years, in robust health, had been advised a year ago, by his family physician, Dr. McCl., to confine himself less strictly to business, because of unpleasant head symptoms.

On Oct. 12, 1866, Dr. McCl. was called to see him, suffering from severe pain in the head, not confined to any one spot, accompanied by constant restlessness and decided mental exaltation, which did not amount to delirium. He talked a great deal more than would be produced by his suffering. His respiration was peculiar, not hurried or difficult, but sighing. He would once in a while draw a deep long breath, fully inflating his lungs, and not be able to explain why he did so. The pulse from 90 to 100, temperature natural. Of his own accord he took cathartic pills, and for twenty-four hours vomited incessantly.

For three days the headache and other symptoms continued, and then his eyes began to be inflamed. The left eye was first affected, and while symptoms began with intolerance of light, tenderness to touch, and conjunctival injection, they rapidly increased to great swelling of the lids, chemosis, and almost entire loss of vision. At the same time the headache was aggravated, and located in the forehead.

Both globes were hard to the touch, feeling like bullets under a cushion. Left eye, count fingers at twelve inches; no examination with ophthalmoscope. Right eye just beginning to be affected, tense, injected, vision good.

As there was no doubt of the nature of the case, *viz.*, acute glaucoma, and that its proper treatment would not permit delay, I proceeded at once, 8 P. M., by the light of kerosene lamps, to do iridectomy. Putting him under the influence of chloroform, I excised in the left eye a piece of the upper part of the iris. In the right eye, I made an incision precisely similar, but refrained from cutting the iris. I was led to do this, because the inflammation was moderate, and I thought paracentesis would suffice. The sequel will show the fallacy of this hope. Applied a flannel bandage and picked lint. The next day, eyes were much better, headache almost gone. During night, took sulph. morphine, gr. $\frac{1}{2}$; did not sleep, was free from pain; changed bandage; globes now decidedly soft, chemosis beginning to abate.

On the 22d, that is, the third day after left eye, counts fingers with left eye at six feet. The eyes steadily improved, and on the tenth day bandage was finally removed. On November 9th, a careful examination was made with the ophthalmoscope, the patient being able to come a distance of a mile and a half to my office. My notes say, in right eye there has been a little return of pain, *vision normal, iridian normal*. T₁? media clear, a minute hemorrhage on nerve, the vessels bend a little at margin of disk, surface of nerve of pink hue. Left eye, *vision normal*, media clear, retinal veins little turgid, nerve pink, not cupped. Vision, right $\frac{2}{3}$ %, left, $\frac{2}{3}$ %. Right, with +8 reads Jæger 5 at 10 inches. Left, with +8 reads Jæger 9 at 10 inches. Has hypermetropia about $\frac{1}{2}$.

Up to the time of this note, which was three weeks from beginning of sickness, the general symptoms had been variable. He was sometimes, apparently, nearly well, and again would go to bed. He had pain over different parts of the head as well as different parts of the body, now in one leg, now in the other, sometimes along the sciatic nerve, sometimes in the side, sometimes at the lower part of the back. Remaining fixed for a few hours or days in one location, it would then settle on another.

At all times, headache was the prominent pain. It was not fixed to one spot of the head. He had no paralysis and no anæsthesia. Pulse from 80 to 108. Radials hard, as if they might be atheromatous. Bowels torpid, but not difficult to move. Stomach intolerant of certain things, but no tendency to vomit, unless irritated. Urine in usual quantity, without albumen, and without casts. Would frequently draw a long sighing breath, and in a sort of involuntary way. Lungs and heart healthy. In sitting for examination, with the ophthalmoscope, would move in the chair uneasily, and say he could not help it. He had turns of marked mental exaltation, when he would talk a great deal, yet rationally. Spirits depressed, never had delirium; sleep always bad. His present behaviour is very different from his usual manner. A rather illiterate man, he yet had a well balanced mind, was deliberate in speech and action, and governed by sound principles.

In view of all his symptoms, which at first the attack of acute glaucoma seemed to sufficiently explain, it became evident that there must be something else the matter. But no definite opinion could be formed.

Nov. 18. *Glaucoma returning in right eye, acute inflammation has begun, globe hard and painful.*—(This is worthy of note, because a large paracentesis had been done at the time of the first operation, in the exact spot, for iridectomy. But the relief was not permanent. However difficult it may be to explain the way in which excision of a piece of iris can cause permanent diminution in the tension of the eyeball, the case now related offers undeniable proof that iridectomy, and not mere paracentesis, is necessary to relieve morbid tension, such as we have in glaucoma.)

Giving the patient chloroform, I did iridectomy upwards. The result was good, but vision was slow in returning. The vitreous humour remained hazy for about ten days. When it cleared up enough to see the optic nerve distinctly, I found upon it the same point of ecchymosis noted before, and the colour of the surface normal. No signs of glaucoma. In the mean time the general symptoms were of the same character as before, only that his strength was more diminished. Headache oftentimes most intense. General neuralgia rather less than formerly. Spent a good deal of time in bed, yet would sometimes be able to go down stairs. Sleep very light.

The remedy which seemed to give most relief was the bromide of potassium, at night, in scruple doses. He called these his sleeping powders. Nervines and tonics were administered; opium was not tolerated. In a few instances, ice applied between the shoulders gave relief to the headache, but it ceased to be efficacious.

Dec. 5. About this time I noticed a change take place in the appearance within the right eye. The optic nerve began to alter in colour; its usual pink passed into a decided pallor; the retinal vessels remained unchanged. As this hue became decidedly pronounced, and indicated atrophy of the nerve, the conviction was forced upon me that there must be serious disease of the brain, and this the cause of all the trouble.

I announced my opinion to the family, and gave an unfavourable prognosis. The gentleman who had the charge of the case, one of our most sagacious practitioners, was not able to share in the positiveness of my opinion, although he would not deny that there might be brain disease. The absence of paralysis and anæsthesia, the clearness of the intellect, and the want of fixedness in the location of pain, were, in his view, serious obstacles to the diagnosis. He thought the symptoms might be explained by hysteria, the cause being obscure.

Another medical man was called in consultation, one of our best pathologists and teachers. He emphatically declared that there was no evidence of brain disease. He suggested that malaria might have caused the troubles, and as the stomach had been irritable, advised injections of a solution of sulphate of quinia per rectum. This remedy proved as useless as all others. Soon the anxiety of the family induced them to try another mode of practice, and homœopathic gentlemen were called. On the certificate, they stated the cause of death to be general debility.

Patient died Jan. 7th, three months from the beginning of his sickness.

For a few days preceding death, his condition was as follows: Rapid and extreme prostration; uncontrollable vomiting for thirty-six hours, after this, coma continuing forty-eight hours, then death. Symptoms conclusively declaring the existence of cerebral disease. There were no symptoms of either heart or lung trouble, no cough, no difficulty of breathing, no expectoration. These facts were ascertained by careful inquiry from the family.

Autopsy seventy-two hours after death.—Weather cold; body on ice and nearly frozen. Only the head could be examined. The scalp thick and very difficult to turn back, because almost congealed by the cold. Nothing peculiar about calvarium. Membranes a little congested; no effusion. At the base of the brain, on arriving at the optic nerves, very great care was used, and at the sella turcica, a black and softening mass was seen, at first supposed to be a tumour. After the brain was taken out, the following was observed: In the tuber cinereum and infundibuliform process and pituitary body, an effusion of blood which was of a dark colour, evidently of somewhat advanced age. Inasmuch as these parts are directly behind, or in contact with the optic commissure, the latter must have been influenced by the clot.

Another clot, about the size of a hazelnut, was found in the right lobe of the cerebellum, at its posterior edge. This too, was evidently of some weeks' or perhaps months' duration. The substance of the brain was firm to the feel; on slicing down the hemispheres, nothing abnormal was seen. The corpus callosum firm and healthy looking. When the lateral ventricles were opened, the septum lucidum, and fornix, and all the tissues adjacent, were softened to a degree of almost complete fluidity. The white fibres floated up like delicate fringes. They appeared as if unravelled out into fibrillæ. So great was the softening, that no complete examination of these parts could be made. Their condition was in marked contrast to the state of the remaining white structures of the brain, as, for instance, the corpus callosum. I emphasize this, because so much time had elapsed since death, as to give rise to the suspicion that the softening might be post-mortem.

Furthermore, as explanation of the softening, and the key to all the lesions, both internal carotid arteries were perfectly atheromatous. Their walls were stiff; they stood up with open mouths, and looked like goose-quills. The basilar artery and posterior cerebral arteries were collapsed and apparently healthy.

Microscopic examination could add little to the information obtainable by the naked eye, because the interesting parts had undergone so great degeneration.

The right optic nerve was removed as far as to the eyeball and microscopically examined by my friend, Dr. F. Delafield. He reported the nerve fibres disintegrated to a granular condition, and so completely disorganized

as to leave no trace of their normal structure. There was no increase of connective tissue.

Taken together, the lesions gave full justification to the diagnosis which the ophthalmoscope furnished—that there was serious and fatal disease of the brain. But no opinion could be formed as to the nature of the disease.

Acute glaucoma, from cerebral apoplexy, is certainly uncommon. Bou-chut mentions two cases, one of them well made out, the other doubtful. It seems to me most probable that the apoplexy at the base of the brain must have occurred at the beginning of the sickness, and that situated in the close vicinity of the optic chiasm and near to the cavernous sinus and carotid arteries, it was the cause of the acute glaucoma. The cerebellar apoplexy was probably of little influence. The development of atrophy in the right optic nerve might have been due to the changes following the apoplexy, or it might have been caused indirectly by the softening at the middle of the brain. The softened portions involved the neighbourhood of the tubercula quadrigemina, and they might have begun to share in the disintegration.

The general symptoms, so anomalous in character, and so puzzling to sound and observant practitioners, must undoubtedly be referred to the brain, although it may not be possible to understand precisely their connections.

Finally, I may add that the basilar process of the occipital bone was unusually soft; it could be penetrated by the point of the scalpel with undue facility. It seemed to be hyperæmic, and the suggestion occurred to me that its condition might have had something to do with the peculiar respiration, by irritation of the roots of the pneumogastric nerve.

This case belongs to a category of which, as yet, few examples have been observed, and, so far as I have been able to find, none are recorded. It gives us additional data to aid us in the diagnosis of difficult and obscure cases of brain trouble. This subject demands immediate and thorough study, and we may yet be able to see with the ophthalmoscope, not only that there is brain disease, but pronounce, with strong probability, upon the character and exact location of the malady.

NEW YORK, Feb. 1867, 65 Madison Avenue.

ART. VII.—*Malignant Pustule, as it appeared in the Vicinity of Las Cruces, New Mexico, in 1865.* By A. H. SMITH, M. D., Assistant Surgeon U. S. A.

DURING the summer of 1865, there appeared, in the vicinity of Las Cruces, New Mexico, an epidemic resembling the charbon, or malignant pustule of surgical writers.

The disease usually made its appearance in the form of a papule, which, from the first, was of a livid or purple colour, whence the popular Spanish name of the affection, "*grano negro*." Even at this early stage, when the external manifestation of the disease was so slight as scarcely to attract attention, there could be felt underlying the papule, and extending for some distance beyond its base a disk of hardened tissue, almost cartilaginous in its firmness, and embracing the whole thickness of the skin as well as a portion of the cellular fascia beneath. In cutting into this the knife creaked as if dividing cartilage, and the resistance was so great that care was necessary to avoid inflicting a deep gash in the adjacent softer tissue, as the limit of the indurated portion was passed. The cut surfaces presented the appearance of a dense fibrous texture, containing in its meshes a deposit of black pigment. The boundary of this mass was abrupt and well defined, giving it the feel of a disk of sole-leather imbedded in the tissues. When incised but little blood flowed from it, and it seemed much less sensitive than the surrounding skin.

Within a period, varying in different cases from two hours to two or three days, the papule passed into a form closely resembling the vaccine pustule on the eighth day, except that the colour was deep purple or black. The surrounding tissues were at the same time the seat of an erysipelatous inflammation, often of great intensity, and spreading with frightful rapidity. Thus, in one instance, within six hours after the papule located on the left side of the chin was observed, the swelling had progressed to such an extent as to close the left eye completely, while the under lip protruded at least an inch beyond the upper one, which was itself somewhat swollen. In other cases the progress was much more gradual, and four or five days elapsed before the patient became sufficiently alarmed to call in medical aid.

The progress of the disease was marked by a steady increase in the size of the pustule, and a corresponding increase in the severity and extent of the surrounding inflammation. But in some cases the pustule remained stationary, while the erysipelatous inflammation extended, and became more and more formidable in its character. The skin became more brawny, and the entire was raised by the effusion of a purple or black serum, forming blebs often of considerable extent. Sloughing of the skin did not occur in any case which came under my observation, probably owing to the free incisions which were made for the relief of tension.

The pain was of a burning character, but only in exceptional cases was it very severe.

The constitutional symptoms seemed to bear an exact ratio to the extent of the local affection. The tongue was moist, and covered with a yellow or brownish fur, and the breath was very offensive. The bowels were usually constipated, but in some cases diarrhoea set in on the second or third day of the disease. The pulse, at first full, quick, and strong, soon became small and frequent. The skin was relaxed, and often covered with

perspiration, especially in feeble persons and children, and when the disease was fully developed; but in robust patients, in the early stage it was hot and dry. Anorexia, to a greater or less extent, was present in nearly every case. In severe cases the mind was heavy and dull, but in no instance was there delirium. The only patient whom I saw who succumbed to the disease died comatose. The pustule, in this instance, was located in the face.

The greatest diversity existed in different cases in the extent of the disease. In some the papule did not exceed the size of a split pea, there was little or no surrounding inflammation, and an absence of all constitutional symptoms; and in a few days all traces of the disease disappeared. In these cases it seemed that the seed had fallen upon unfavourable soil, in which it could not take root. At other times the soil seemed to have been already prepared, and only awaited the seed to yield a speedy and abundant harvest of mischief.

In favourable cases a period arrived when the pustule ceased to enlarge, and the surrounding inflammation gradually resolved. A number of days then elapsed before the ulcerative process began, but eventually the entire disk of hardened tissue separated and was thrown off, leaving a healthy granulating surface.

A careful inquiry into the cause enabled me, in the majority of cases, to trace it to infection from diseased animals. A distemper was prevailing at that time to a slight extent among cattle, and, though I had no opportunity of seeing an infected animal, I obtained a meagre description of the symptoms from the Mexican rancheros. The animal, it was said, ceased feeding, became restless and uneasy, and soon began bellowing as if in great pain. Then it was seen to throw its head suddenly into the air and run violently for a short distance, and fall to the ground. Regaining its feet it would rush wildly forward, bellowing piteously, then rearing on its hind legs again fall. The duration of the disease was but a few hours. The poorer class of the natives did not scruple to eat the flesh of animals dying in this way, while some, a little more fastidious, killed the animal for beef as soon as the disease was well pronounced, taking to themselves great credit for not following the disgusting example of their neighbours.

Whether simply eating this diseased meat was sufficient of itself to produce infection it was impossible to determine, although many of the patients declared that they had not touched it with their hands. Still the fact that in every instance the pustule occurred upon a part of the body not protected by the clothing, goes far to confirm the view of the disease that it is not in any degree the local manifestation of a constitutional infection, but always the result of direct local inoculation.

One instance occurred in which the source of the disease and the mode of infection were demonstrated with remarkable clearness. Two men were engaged in skinning an animal which had died of the distemper. One of

them had a pimple on the face, which he had scratched with his nails until it bled. The other had received a scratch in the face from a thorn in passing through the chaparal. The day was extremely warm, and the men frequently wiped the perspiration from their faces with their hands, covered as they were with the fluids from the animal. In a few hours, pustules were developed upon the abraded surfaces in both individuals. The disease proved fatal in one case (which I did not see), the other recovered with a considerable loss of tissue from the cheek.

There were cases, however, in which I failed to trace the disease to any infection, the patients stoutly denying that they had eaten any flesh of an animal that had died, or that had any symptoms of disease, or that they had handled, or been in the neighbourhood of any such source of infection. Still I am of opinion that the heavy denunciations which fell upon the heads of those who confessed their shortcomings at the beginning of the epidemic, had the effect thereafter to discourage others from telling me the truth.

One case, occurring in the hand, made its appearance immediately after handling a number of dry hides.

The *treatment* which I found the most efficacious was the following: The pustule, with the hardened tissue surrounding and underlying it, was freely divided by a crucial incision, and a poultice, containing charcoal and chlorinated soda, applied. If the strength of the patient would admit its employment, a brisk cathartic was at once administered. Tincture of the chloride of iron was given in large doses frequently repeated. Brandy, carb. of ammonia, etc., were employed in advanced cases, if the state of the pulse seemed to demand it. Opiates were given when required to allay pain and procure sleep. The tinct. ferri chlor., however, was my principal dependence. In nearly every instance it arrested the disease almost immediately. Unfortunately, my supply was limited, and gave out towards the close of the epidemic, after which I found great difficulty in managing the disease. All the other forms of iron within my reach were tried, but found comparatively useless, and I attribute the loss of my one fatal case chiefly to the want of this remedy.

The following is an illustration of the result of treatment in an apparently hopeless case:—

CASE. I was called to see a woman in the neighbouring town of El Piecho, and, on arriving, found her in the fifth day of the disease. The pustule was seated upon the back of the right wrist, but it was now scarcely distinguishable from the swollen and discoloured tissue which surrounded it. The whole limb was swollen to at least twice its normal size, and the outer side was one series of blebs, filled with a purple or black fluid. The erysipelatous inflammation extended from the arm over the front of the thorax to the median line. Pulse very small and weak, and too frequent to be counted accurately. Skin cool, pale, and relaxed, and covered with a clammy sweat. Mind heavy, the patient taking no notice

of what was passing in the room, but giving rational answers when questioned in a loud tone. When asked, stated that the arm was very painful, but otherwise made no complaint.

Yielding to the urgent request of the friends that I should do *something*, even if there was no hope, I determined to treat the case vigorously, though with no expectation of a successful result. Four incisions, from three to six inches in length, were made in the forearm and arm, dividing the skin and superficial fascia. An immense amount of bloody serum was evacuated, and the tension materially relieved. The arm was then enveloped in a poultice of charcoal and yeast. Tr. ferri chlor. ʒj, whiskey ʒj, were given, to be repeated every two hours until five doses had been given, when the quantity of iron was to be diminished one-half. Beef-tea was to be given as freely as the patient's stomach would bear it. Before I left the patient expressed herself as feeling somewhat relieved. A supply of medicine was left, and careful directions given, and the husband was instructed to inform me as to her condition on the following day. This he failed to do, and I took it for granted that the case had proved fatal, and did not repeat my visit. Subsequently I learned that the woman recovered, but with her arm perfectly useless. The improvement was so great during the night following my visit, that the husband did not consider it worth while to cross the river (then very high) to report to me, inasmuch as he had still a sufficient supply of medicine.

The source of infection in this instance was a goat, which, having the symptoms of the distemper, had been killed "*for fear it would die*," and the flesh eaten by the family. Although several persons ate of the meat, but one was affected, but as she was the one who prepared it for the table the case only goes to corroborate the view of exclusively local infection.

In a few cases in which I saw the patient very early and before any constitutional symptoms had appeared, I contented myself with destroying the papule very thoroughly with caustic potash, after which there was no further trouble.

The duration of the epidemic was about two months, beginning in July and ending in September.

ART. VIII.—*The Appearance of the Membrana Tympani and Fauces in 296 Cases of Acquired and Congenital Deaf-Mutism.* By D. B. ST. JOHN ROOSA, M. D., Professor of the Diseases of the Eye and Ear in the Medical Department of the University of the City of New York, and GEORGE M. BEARD, M. D., of New York.

THE examinations of which the following paper aims to give an account, were made by us at the New York Institution for the Deaf and Dumb, and at the American Asylum for the Deaf and Dumb, in Hartford, Conn. Our labours at the first-named institution were interrupted by the breaking out

of typhoid fever when we had examined but seventy-five cases. At the Hartford Asylum, however, we were able to examine nearly every case in the institution.

We are greatly indebted to Dr. L. A. Rodenstein, the physician to the New York Asylum, for courtesies extended and facilities afforded for conducting our examinations, also to Dr. Peet, the President, and Mrs. Hotchkiss, the Matron. In Hartford, the Rev. Collins Stone, the Principal, gave us hearty assistance; and his son, Edward C. Stone, M. A., one of the Instructors in the Asylum, afforded us his personal aid during the whole period of the examinations, thus greatly expediting our labours. To all of these we herewith present our grateful acknowledgments.

The ears were all examined by means of Tröltzsch's concave mirror and the tubular specula, the source of illumination being ordinary daylight.

The assigned cause of the deaf-mutism was ascertained in the case of the Hartford inmates by reference to the books of the Institution, where it was recorded as given by the parents or friends of the children. In New York the same information was furnished either by the pupils themselves or by the matron.

While we recorded the cause just as it was furnished us, we have not always regarded it as correct, but have placed several cases among the "congenital" which were deemed "acquired" by the friends or the pupils themselves. The persons examined were, with very rare exceptions, in excellent general health at the time of examination.

Inasmuch as nearly all the drums are described as pathological, it may be well to state what we deem its physiological state. We consider a normal membrana tympani, examined by reflected daylight, to be a translucent pearl-gray membrane (Politzer) with the head and handle of the malleus distinct, not very prominent, however, or projecting much above the plane of the membrane. On the lower segment is a reflection of light of a general triangular shape, its apex resting on the lower extremity of the handle of the malleus. The angle formed by the membrane with the upper wall of the external auditory canal is one of about 140° (Tröltzsch). We have verified these ideas as to a normal membrana tympani by numerous recent examinations of ears having their normal function unimpaired.

We understand by chronic pharyngitis a chronic inflammation of the mucous membrane of the pharynx, in which some or all of the following objective symptoms are present. Hypersecretion from its entire surface, as evinced by the collection of masses of mucus or muco-pus; enlargement of the mucous glands, causing them to resemble granulations; a dry glassy appearance of the mucous membrane, which is traversed by enlarged veins. The nasal cavities sometimes participate in the morbid condition.

The object of our investigations has been entirely *etiological*, in no sense *therapeutical*. In this respect it differs from that of most of those pre-

vously made by others. Among our deductions, however, we place one which urges the necessity and probable usefulness of treatment for most of the acquired and for some of the congenital cases, not for the purpose of restoring the hearing, but for the sake of relieving other distressing symptoms, which in some cases are not without danger to life. Should the verdict of the profession give any value to the statistics here presented, we propose to continue our investigations. Examinations of the dead subject, in cases of deaf-mutism, such as have already been made to a limited extent, especially by *Voltolini*, of Breslau, should be undertaken in order to confirm or disprove the deductions which seem to us to be indicated by our examination.

The tables we have prepared showing the sex, age, appearance of the membrana tympani and of the pharynx, and the assigned cause in each case, with our remarks, would occupy too much space for publication in this Journal, and we therefore are obliged to confine ourselves to the following summary of the results.

Summary.—Whole number of cases examined, 296.

Classified as probably *congenital*, 182, or 61 per cent.

Classified as probably *acquired*, 114, or 39 per cent.

The membrana tympani was found to be sunken or opaque, or showing other evidences of former inflammatory action in the cavity of the tympanum—

In 118 of the congenital cases.

"	16	"	"	"	it was congested.
"	22	"	"	"	" normal.
"	4	"	"	"	there was calcareous degeneration.
"	14	"	"	"	it was absent.
"	8	"	"	"	" not clearly seen on account of wax in the meatus.
<hr/>					
182					

In 80 of the acquired cases the membrana tympani was present.

"	29	"	"	"	"	"	"	"	perforated with ulceration in it and the middle ear.
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" 2 of the acquired cases there was calcareous degeneration.

" 3 " " " it was not clearly seen on account of wax.

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Remarks.—The following facts are worthy of note: There was chronic pharyngitis, or tonsillitis, or both in 111 of the congenital and 89 of the acquired cases; making in all 200, or *more than two-thirds of the whole number of cases examined*. The intimate connection between the faucial mucous membrane and that of the middle ear is thus indicated.

The inmates of the New York Asylum were affected with diseases of the

throat to a greater extent than those in Hartford. The greater proximity to the sea-shore of the former place may explain this.

It is probable that a large proportion of deaf-mutes, in both congenital and acquired cases, are annoyed by the subjective symptoms of inflammation of the middle ear. We made inquiry of the inmates at the New York institution as to this, and we should judge that about one-half of these are victims to the various phases of *tinnitus aurium*.

Our information as to the parentage of the mutes is not very complete, since the friends do not readily admit or speak of intermarriages. Yet a few striking cases were observed. A certain district in Massachusetts, where the inhabitants are shut out from the world, and where intermarriage is the rule, furnishes every year a certain number of pupils to the Hartford Asylum.

Scarlet fever is the assigned cause, and undoubtedly the real one in nearly one-half the acquired cases. The existence of hereditary predisposition to deaf-mutism was observed in about 1 in 12 of the 225 Hartford cases.

After some study of our statistics, perhaps we are justified in concluding—

I. *By far the greater number of the cases of congenital deaf-mutism, as here observed, had their origin in inflammation of the middle ear, occurring in intra-uterine life.*

(Perhaps some of the cases classed as congenital occurred from the same cause in early infancy.)

II. *If physicians generally were properly instructed as to the pathology, diagnosis, and treatment of the diseases of the ear, there is little doubt but that very many of the cases of acquired deaf-mutism could be prevented, or that they could be greatly modified in their character.*

III. *A great majority of those affected with inflamed fauces and ulcerating ears, could be relieved by treatment from some of the distressing and dangerous symptoms. We believe that every deaf and dumb institution should have attached to it a physician who is competent and willing to look after the ears as well as the other organs of the inmates.*

ART. IX.—*Aneurism of the Common Carotid Artery: Compression; Cure.* By JOHN G. KERR, M. D., Canton, China.

A CHINESE soldier, aged 32 years, was shot in the left side of the neck in June, 1865, the bullet lodging there. The patient was admitted into the hospital of the Medical Missionary Society on the 27th of Jan. 1866. At that time there was a tumour on the left side of the neck about the size of a man's fist, which extended from the angle of the jaw almost

to the clavicle. The pulsation and bellows sound indicated clearly its character.

The only chance for ligature was at the inferior triangle. I had not seen any report of an aneurism of the carotid treated by compression, and the most recent works on surgery do not recommend it in this locality. Prof. Gross, in his invaluable work on surgery, says: "It is obvious, from the relations of the vessels and nerves of the neck to the tumour, that compression, now so much employed in the treatment of aneurism of the lower extremity, cannot be brought in play here, the parts being intolerant of the requisite manipulation, to say nothing of the obstruction which it would occasion to the return of the blood in the internal jugular vein," &c. *A priori*, these obvious objections would seem conclusive. The case here reported has, I hope, established the fact that aneurism of the carotid is amenable to the use of compression, and that a dangerous and difficult operation may be replaced by a mild and successful application of surgical art.

It was after much deliberation and hesitation that it was decided to try compression in the present case, and it was only an experiment at the beginning. The Chinese pupils in the hospital were taught to apply pressure with the thumb. At first they took turns of an hour each, but afterwards the time was limited to half an hour.

At the commencement of the treatment, the pressure caused in eight or ten hours such a degree of pain that it was necessary to desist. After an interval of a few days the repetition of the experiment was followed by excruciating pain which extended to the whole side of the head.

Doubts as to the propriety of continuing the treatment arose, but it was found that after a few days' rest the pain subsided, and gradually a tolerance of pressure was established. In the course of a few weeks the patient was able to bear continuous pressure day and night. It was not until this had been attained that the aneurism began to show any signs of yielding. Even then it was necessary to give periods of rest every three or four days. During the latter part of the treatment it was found that a less amount of pressure controlled the pulsation, and it was only kept up during the daytime, or from 6 o'clock A. M. to 10 o'clock P. M.

No record was kept of the exact length of time during which compression was applied, but it was not less than twenty days. The patient was discharged April 20, so that the treatment extended over a period of eighty-two days. At the time he left the hospital the pulsation and bellows sound had entirely ceased and the tumour had sensibly diminished in size. The patient was seen again May the 14th, when the tumour had diminished in size fully one-third.

The following inferences may be drawn from the above case.

1st. That a tolerance of compression may be established in the treatment of aneurism, even where important nerves are connected with the artery.

2d. That when severe and even excruciating pain prevents continuous compression, it is important to keep up, at intervals and with great caution, such amount of pressure as can be borne.

3d. That a powerful remedy, such as compression is proved to be, may often be successful in the most hopeless cases, if applied with perseverance through a sufficient length of time.

ART. X.—*Removal of a Fibrous Polyp from the Inferior Anterior Surface of the Right Vocal Cord with the aid of the Laryngoscope.* By J. SOLIS COHEN, M. D. (With a woodcut.)

On the 9th of January last, Mrs. W——s, of this city, æt. 47, completely aphonic, presented herself for a laryngoscopic examination. Her story ran thus: She had been very hoarse for more than a year, and for the past seven months completely aphonic. She had been variously treated for laryngitis and for chronic bronchitis, with internal remedies, vesication externally with croton oil, &c. She had recently come under the care of Dr. L. Turnbull, of this city, who, suspecting an organic cause for her aphonia, had sent her for an examination.

The peculiar character of her whisper—laryngeal, and not oral as in functional aphonia—led to the inference that some mechanical impediment prevented due vibration of the vocal cords; and the introduction of the laryngeal mirror revealed the existence of a small, whitish, oyster-like polyp, the size of a large common white bean, growing from the under surface of the true vocal cord of the right side, within a line of its anterior attachment to the thyroid cartilage. The following day Dr. Turnbull confirmed the diagnosis, and confided the patient to the care of the writer.

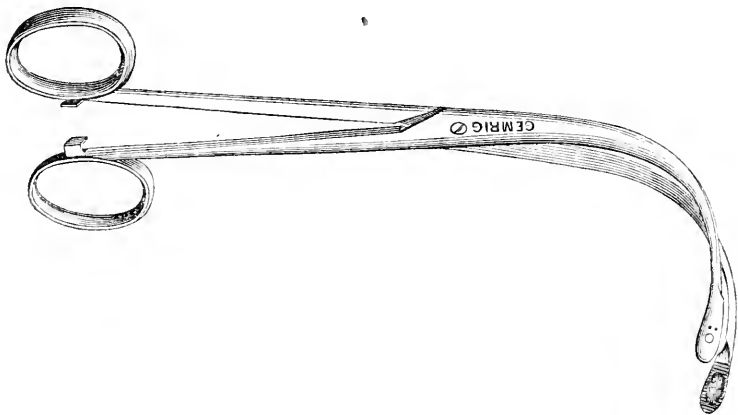
During inspiration the polyp remained suspended in the lower cavity of the larynx; but expiration propelled it upwards so as to encroach considerably upon the aperture of the glottis, which was much smaller than usually observed. As the true vocal cords approximated in response to attempts at phonation, the polyp, as it was raised, was observed to twist round upon its attachment, so as to expose a portion of its anterior surface, wedging between the lips of the glottis, and thus preventing their approximation. The cause of this twisting was not recognized until after the removal of the tumour. This diagnosis and peculiar appearance was confirmed by Profs. Gross, H. H. Smith, Dickson, Drs. Agnew, Da Costa, Turnbull, Wm. H. Panoast, and others.

On questioning the patient as to the existence of subjective sensations, she related that her annoyances were increased during damp weather—physical causes favouring a temporary increase in the size of the polyp; that she was frequently compelled to sleep with her head elevated to secure easy respiration, and freedom from distress; that she would sometimes experience a sudden paroxysm of impending suffocation, promptly relieved by coughing—this from sudden impaction of the polyp, and release following the mechanical effort; farther, that she would be occasionally troubled with a peculiar sensation while swallowing, "a sort of explosion-like in the throat, just as if the finger was pressing down the cork of a bottle of porter, that the gas was forcing out," with a sense of constriction beneath the sternum—in all probability recoil of the expiratory current; a similar sense of constriction at the same point accompanied every effort at articulation; rapid breathing would be accompanied with "flapping in the throat;" and any undue exercise, as ascending a staircase quickly, or hurrying to catch a street car, would bring on dyspnoea and temporary distress.

Jan. 14th the treatment was begun by introducing instruments within the larynx, moving the polyp with a bent probe, so as to accustom the parts to manipulation. The tumour presented a firmer resistance to the

sense of touch, as communicated to the finger, than had been anticipated; but neither at this time nor on any of the subsequent occasions in which this training process was repeated, could the pedicle of attachment be discerned.

At the eighth interview the polyp was successfully seized, and removed entire, with a single effort. The instrument employed was the *pince à polype du Docteur Fauvel*, figured in the accompanying cut.



This instrument is a long pair of steel forceps, properly curved, the blades of which terminate in small scoop-like expansions, serrated, and inclosing small prongs; the rings on the handle are furnished with a stout sliding catch, which, when closed, secures the gripe.

On the 17th, while manipulating with the forceps, the polyp was seized at its base, but slipped from the instrument. The result, as witnessed by Prof. Dickson, was to congest the polyp, which became intensely red; a drop or two of blood escaped from a puncture made by one of the prongs, and was expectorated; shortly after the polyp was restored to its original colour, except a livid spot around the point where it had been pierced. Considerable shrinkage took place, followed by a change in the character of the voice, which subsequently emitted an occasional hoarse laryngeal tone, markedly different from the previous whisper.

At the time of removal, Jan. 22d, the polyp was seized close to its attachment, and came away entire; it had no pedicle. The muscular effort requisite to detach it was trifling, and the sensation to the patient, as if a good hold had been taken, and it had slipped from the instrument. The emotion of the patient at breathing so much more freely than she had done for more than a year, prevented spasm; but, contrary to expectation, there was no immediate improvement in the voice. There ensued a trifling bloody expectoration to the amount of half the capacity of a lady's thimble. On examination with the mirror, no remnant of the tumour could be observed; but both vocal cords, and all the adjacent parts, had become intensely congested. It was not deemed requisite to make any local application within the larynx, and half an hour after the operation the patient returned to her home with instructions to lie down, and drink barley-water.

The tumour, as removed, was slightly congested, of the size of a large common white bean, smooth on its exterior, but somewhat irregular in

outline; compressible and elastic, but not soft to the pressure of the finger-nail. Shortly after the removal it was examined under the microscope by Dr. Wm. H. Pancoast, and proved to be a fibrous polyp, instead of a gelatinous one, as had been diagnosed in the mirror.

No assistant was employed in the operation; no support to the head of the patient; no apparatus to hold the laryngeal mirror; no instrument to depress the tongue; the design from the first having been to take advantage of a fortunate opportunity for removal without the co-operative consciousness of the patient. Wherever it is at all practicable, it is of great value to all concerned to use as few appliances as possible; for any restraint on the part of either patient or operator increases the difficulty of manipulation. The patient sat at ease upon a stool, holding the tip of her extruded tongue between her fingers and thumb, her handkerchief being interposed to prevent slipping. The light of a coal-oil lamp was reflected into the fauces from Tobold's pocket condenser, the laryngeal mirror being loosely held with the left hand, and the operating instrument with the right.

The day after the removal of the polyp, laryngoscopic examination showed the right vocal cord still vividly red, but the left cord had regained its normal colour; it was considerably deflected outwards, and was but half the width of the other cord, having apparently undergone atrophy, evidently the result of frequent compression by the tumour. Just beneath the commissure connecting the cords anteriorly, there was perceived a small red projection, showing that the polyp had had a second attachment at that point. This double attachment to the reentrant angle of the thyroid cartilage, and to the under surface of the cord, explains the mechanism of the peculiar twisting of the polyp observed whenever it prevented the approximation of the cords in attempted phonation. The voice had improved, but, though distinctly sonorous, was hoarse and rough. No local application was made.

Two days subsequently, on the 25th inst., the patient returned; the congestion having now diminished considerably, the little protrusion at the thyroid angle, just below the anterior angle of the glottis, as well as the adjacent mucous membrane, was freely cauterized with the solid nitrate of silver. Now the spasm was intense, the patient suffering much more than from any previous manipulation; but the coughing soon ceased, and the immediate improvement in the character of the voice was marked.

Examining the parts two days after this application, it was seen that superficial ulceration had taken place at the spot cauterized, and over so much of the adjacent mucous membrane as the polyp had been wont to press against during inspiration. This was not at all painful, but had provoked frequent expectoration. The ulcerated surface was gently swabbed with a brush that had been dipped into a solution of bromide of ammonium in glycerine $\mathfrak{z}\text{ij}$ ad $\mathfrak{l}\mathfrak{ssj}$.

As this ulceration gradually healed, the parts resumed their normal appearance, and the voice steadily improved. No second application of the caustic was necessary.

At the latest date the appearance of the parts was normal, with the exception of the atrophied appearance of the left vocal cord, though its free border presented a straighter outline. No trace of the existence of the tumour could be recognized, and the voice had resumed its natural timbre; but although less clear than formerly, was sonorous and powerful, much to the gratification of the patient, for now she "can holloa

up-stairs to the children," the inability to accomplish which domestic desideratum had been not among the least of her deprivations.

This case is recorded as one of peculiar interest, from the fact that the polyp grew in the larynx of a female; that it occupied the right vocal cord, was a sub-glottic tumour, and had an attachment to the reentrant angle of the thyroid cartilage—all of which conditions are severally exceptions to the general history of laryngeal polyps.

PHILADELPHIA, Feb. 5, 1867.

ART. XI.—*Description of a Bed for Invalids which admits of Leg Exercise, and of a Noiseless and Easy Adjustment to any Point between a Horizontal and Vertical Position.* Read before the Massachusetts Medical Society, May 30, 1866. By EPHRAIM CUTTER, M. D., of Boston, Mass. (With a wood-cut.)

IN 1864 a married lady, 45 years of age, mother of several children, came under my care with the following signs and symptoms:—

1. A full, round, fluctuating swelling, as large as a man's fist, seated below the left great trochanter, and occupying the middle of the outer aspect of the thigh. It had been previously subcutaneously punctured at its lowermost middle part with a grooved exploratory needle, which brought away a fatty fluid, as tested by the microscope. Subsequently it suppurated; the whole mass degenerated and came away, leaving a cavity which measured, with Simpson's uterine probe, $7\frac{1}{2}$ inches in length. This abscess has not healed to the present time.

2. There were pain and dragging in the back over the sacrum. The os uteri was patent enough to admit the forefinger. Its edges were thickened, indurated, ragged, and ulcerated. The uterus itself seemed fixed and immovable. Pronounced, in consultation, by the elder Dr. Storer, of Boston, to be probably a cancerous affection.

3. Intense pain in the right hip-joint, with or without pressure. Pain in right knee-joint (subsequently there was fluctuation in same knee-joint). No shortening (subsequently there was shortening of one inch); absence of right natal furrow; inability to bring right knee to chin. On these symptoms this local disease was called morbus coxarius.

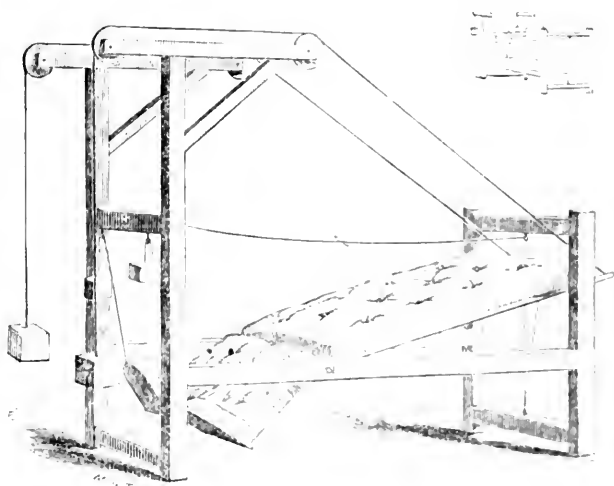
The other organs and functions seemed as sound as could be expected under the circumstances.

Without entering further into details, it is sufficient to state that as the patient became bedridden, it also became necessary to have a bed specially contrived for her use, to provide for her comfort, to give an opportunity for exercise, and to avoid a permanent bedridden condition. Her husband, a wealthy and influential merchant, was unable to find any bed that would suit. Being exceedingly interested in the case, and in this manner thrown on my own resources, I contrived the bed which is here described, and which answered admirably to the case; so admirably that I have ventured to bring it forward to notice, with the hope of benefiting some poor bedridden sufferers whose couches are beds of anguish.

The following principles were designed to be carried out:—

1. *Immobility* of left hip-joint.
2. *Mobility* of knee-joints, with leg exercise, so that the patient might derive the benefit of the use of some of her locomotive muscles.
3. A noiseless, easy, and quick adjustment, capable of being acted by the patient herself.
4. A contrivance to gradually bring the patient to a vertical position, so as to get her upon her feet.

How far these points were accomplished, the reader may judge. It should be remarked that the decubitus was dorsal, and *only* dorsal.



The bed consists of two head-posts 55 inches long, two foot-posts 57 inches long, connected by two rails 91 inches long and separated from each other 28 inches by four cross-bars. A frame of oak forms the bed. It is divided into three parts—one for the body and thigh, and two for the legs. These are connected together, and play upon an iron rod 28 inches in length and $\frac{3}{4}$ inch in diameter. The rod runs through the rails about 24 inches from the foot-post, and also through eyes of iron attached to the body and leg portions in this order: *first*, through an eye in one side of the body portion; *second*, through two eyes of the first leg portion; *third*, through two eyes of the second leg portion; *fourth*, through the remaining eye of the body portion. The body portion plays easily inside the frame of the bed, and is prevented from falling through to the floor at the head by stops of wood nailed on to the rails. These stops may be left out, and the head of the patient depressed below the dead level, an important therapeutical agency in uterine or intestinal hemorrhage.

The leg-rests are provided with foot-pieces, to which cords are attached which play over pulleys fixed in the upper connecting bars of the foot-posts,

and are counterbalanced by granite blocks weighing about 14 pounds each. These foot-pieces are mortised into the leg-rests at an angle of about 81 degrees, and are upholstered.

The tops of the foot-posts are fitted with horizontal bars 45 inches long, stayed with props, and provided at both ends with pulleys of wood 5 inches in diameter. Over these pulleys play two bed-cords, one end of each of which is fastened to the free extremity of the body portion of the bed, and the other end to blocks of granite, in this case weighing about 28 pounds each. A cord is attached to the middle of the free end of the body portion of the bed, runs through a pulley in the lower bar of the head portion and another pulley in the upper bar, and then is fastened to the upper bar of the foot-posts.

The bed is upholstered by ticking, covered with corn-husks and another layer of ticking. It is then overlaid with a hair mattress, which has three divisions, corresponding to the divisions of the bed. Two wooden buttons at the head are used to secure the bed in the horizontal position while the patient is getting off or on.

With this general description, the use of the bed is apparent. The patient is placed on the bed, and her weight accurately counterbalanced by the granite blocks. If leg exercise is desired, this is accomplished by pressing down the foot-pieces to the floor, if desired. If the patient is too weak, the exercise may be passive. By pulling on the cord attached to the foot-post upper bar, the body portion rises to any point desired; or by pulling on the cord in the other direction, the bed is depressed. In all these movements the foot-pieces follow the upper part, so that the plane of the bed is always in the same line, except when the leg-pieces are depressed by special intent.

It is easy to see how this apparatus conduced to the comfort of the patient. The change of the plane of inclination was a great relief to the tedium of lying in bed. The motions were noiseless. They were made by the patient thus securing arm and leg exercise. Practically, it was a great success; for the exercise induced so great an increase in the strength, and the gradual approximation of the bed in direction towards a vertical line accustomed the patient to an upright position, so that in about two months she was able to leave the bed and go on crutches.

Besides bedridden patients, it is thought that cases of fractured thighs and legs may be benefited by the use of this bed.

Accessory.—In case it is desired to make up the bed, the following provision is made: A frame 24 inches in width and 89 inches in length is attached by hinges by the side to the bed. The other side is supported by two legs attached by hinges, and capable of being folded up. The bed is buttoned down in a horizontal position, and the patient is slid sideways on to the temporary frame.

If required to move the patient into another apartment, the temporary

frame may then be unhinged by sliding, and the patient carried wherever it is necessary.

Remarks.—The width may be increased to that of an ordinary bed, without losing the principle.

The following table gives a list of admeasurements:—

Length of bed from outside of posts	. . . . .	89 inches.
Width “ “ “ “	. . . . .	32½ “
Size of posts	. . . . .	4 × 3½ “
Length of head-posts	. . . . .	54¾ “
“ “ foot-posts	. . . . .	87 “
Size of rails	. . . . .	3½ × 2¾ “
“ connecting bars	. . . . .	1 × 2½ “
“ pulley bars overhead	. . . . .	2½ × 1½ “
Length of “ “	. . . . .	45 “
Size of wooden pulleys	. . . . .	5½ inches diam., ½ inch thick.
“ iron “	. . . . .	1 inch diam.
“ cords	. . . . .	common clothes-line.
Length of body and thigh portion	. . . . .	54 inches.
Width “ “ “	. . . . .	26 “
Thickness of frame of body and thigh portion	. . . . .	1¼ “
Length of foot-pieces	. . . . .	19 “
Width “	. . . . .	11½ “
Length of joint-rod	. . . . .	32 “
Size of granite blocks for foot-pieces	. . . . .	7 × 7 × 5 “
Weight “ “ “	. . . . .	28 pounds.
Size of blocks on foot-pieces	. . . . .	7 × 4½ × 3½ inches.
Weight “ “ “	. . . . .	14 pounds.

(These weights may vary with the size of patient.)

Height of rails from floor	. . . . .	26 inches.
Fastening of rails	. . . . .	common bed-screws.

TRANSACTIONS OF SOCIETIES.

ART. XII.—*Summary of the Transactions of the College of Physicians of Philadelphia.*

1866. *June 6. Pyæmia.*—Dr. HAMILTON reported the following case : On Wednesday morning, Jan. 10, 1866, I was requested to visit W. S., aged 14 years, rather large, and of fine, healthy appearance. On inquiry, I learned that on the previous Saturday he was engaged nearly all the afternoon in skating ; that he became very cold soon after going upon the ice, and so continued ; that he had three or four rather hard falls, and returned, perfectly chilled, to his home. The subsequent morning, Sunday, the 7th, he began to complain of general soreness and aching, slight pain in the head, and alternate sensations of chilliness and fever. On the 8th, an eruption over the surface of the body was superadded to the symptoms of the previous day. On the morning of the 9th he felt much better ; but in the afternoon he was worse, the fever and general malaise being a good deal increased, and during the night he complained of a very severe pain in the right groin.

When I first saw him on the morning of the 10th, he was confined to bed, and complaining of very severe pain in the groin and slight headache. Fever, not very active ; the rash was still very distinct, and resembled precisely what is seen in scarlatina, though no other symptom of this disease was present ; some indistinctness of speech was also noticed. The groin, on pressure, was very tender and slightly swollen, the swelling diffused, rather than circumscribed. On the 11th I learned that he had been quite delirious during a part of the night, and that certain spasmodic twitches, to which he had for the past five years been subject, had occurred since his illness more frequently than usual. These movements were confined chiefly, or exclusively, to the upper extremities, the head, and features of the face, and consisted in a sudden retraction of the head, distortion of the eyeballs, retraction of the corner of the mouth to one side, and elevation of the arms, violently extended, above the head. Medical treatment, directed to the upper part of the spinal cord, as the probable seat of this affection, had long ago been tried, without benefit ; but, as his health and intelligence were good, no attention had latterly been given to it. The groin was rather more painful and swollen than the day before ; rather more fever ; rash disappearing, but several reddish blotches were noticed upon the right elbow. On Friday the pain in the groin was nearly gone, but the ankle of the left limb had suddenly become very painful, some swelling of the joint was noticed, and a large red, ovoid blotch occupied about two square inches of the skin nearly two inches above the external malleolus. There was a scab, just below the ankle, twice the size of that of a fully developed vaccine pustule, with matter beneath, caused by the pressure of a boot ; speech more imper-

feet; delirium the previous night very great; efforts to leave the bed almost incessant; slight delirium during the day. On the 13th, 14th, and 15th the symptoms the same as on the 12th, but the pain near the ankle was more intense, and so much delirium that it was almost impossible to keep the patient in bed. On the 16th, rather less fever, less delirium during the night, not quite so much pain at the ankle, but rather more in the groin, with increased swelling, extending somewhat into the thigh; desire for food nearly gone. 17th and 18th, same condition as upon the previous day.

On the afternoon of the 19th a severe chill occurred, followed by great nervous irritation, high fever, and great general suffering. It may here be incidentally stated that mustard plasters, applied after the chill to the inside of the legs, produced at the time but a moderate degree of redness, which faded on the second day; and yet on the next Friday, just one week from the time of application, full vesication took place. 20th, high fever, very delirious, but at times answers quite well; increased difficulty of articulation. On the 21st a swelling was observed on the right elbow, where the blotches had previously been seen, and on examination of the left ankle the same thing was found to have occurred; the swellings in both places evidently contained fluid. A third swelling, similar in character, was discovered in the right iliac region, a few inches above the groin. A slight perspiration, the first seen, appeared upon the forehead, face, and neck. On the 24th a crackling of the knee-joints, on motion, was distinctly heard at some distance from the bed; great aversion to food.

From Jan. 25 to Feb. 3 his situation was somewhat similar to that of the few previous days: always more or less delirium, night and day; sweat confined to the head, and upper part of the trunk; an extraordinary crackling on movement of the knees, ankles, thighs, wrists, elbows, shoulder-joints, or neck, loud enough to be heard in any part of the room. Feb. 4, the skin over the swelling near the left ankle is becoming quite dark and mottled; the patient no longer draws up his legs, either from want of power or from fear of increasing his suffering; the right groin and thigh still swelling, and more painful; some complaint of the left groin, which is somewhat tender and slightly swollen; the abdomen is also slightly swollen, has in fact been so for some days past. 8th, the feet have during the past few days become œdematous; and on the 9th the urine was tested, and found to abound in urates. 10th, less swelling of the feet; patient has for two or three days and nights past sat in an arm-chair, resolutely refusing to be moved; cannot at present bear the slightest movement of either of his lower limbs. 11th, the swelling upon the right elbow broke, and discharged thick pus. 12th, swelling of the feet nearly gone; thigh still growing larger, with increasing pain; slight increase of appetite; in the afternoon fainted, apparently caused by suffering and the long-continued upright position; the crackling of the joints continues, but is not so audible. The 12th, 13th, and 14th showed no important changes. On the 15th the abscess near the left ankle broke, and discharged freely. On the 17th the abscess ceased discharging. Pulse is now becoming a good deal weaker and more frequent, and patient shows less muscular strength.

On the 19th it was evident that an immense abscess was forming in the right thigh. A swelling of considerable size was also discovered upon the right nates, not far from the anus, its surface much abraded and ulcerated;

and now, for the first time, a shortening of the left leg was noticed, and the foot inclined inwards in a manner that had not been observed before; no appetite, and flesh wasting rapidly; has consented, after much persuasion and threatening of the serious consequences to himself of a refusal, to be replaced upon his bed. On the 23d matter was found discharging from the swelling upon the nates, showing the existence of another abscess; right thigh enormously swollen, pain extreme.

On the 26th the abscess of the thigh broke, and discharged in a very short time some pints of matter. On the 3d of March a small swelling, similar to the others, was found upon the right wrist; the abscess upon the abdomen, circular in form and about three inches in diameter, seems disposed to flatten and shrink; debility rapidly increasing; much œdema of both limbs, from the groins to the toes. On the 10th the abdomen had become quite tympanitic, and the œdema greatly increased. On the 14th, 15th, and 16th fever was very high, and on the 17th erysipelas inflammation, commencing at the orifice of the abscess in the right thigh, spread with great rapidity downward to the knee, and upward beyond the groin to the distance of several inches upon the abdomen. On the 18th the inflamed surface became quite dark, simultaneously with collapse; and on the 19th death terminated the most painful attack of disease, duration considered, that it has been my lot to witness.

No autopsy was made, but, on examination, the left thigh was found to be dislocated at the hip-joint, the result, doubtless, of an abscess within the joint, destroying the ligamentous connections, although but little pain was at any time referred to this region.

We have preferred thus to relate the actual progress of this remarkable case, without embarrassing or unnecessarily extending the account by an intercurrent detail of treatment, which did, in fact, little more than afford partial relief to the excruciating and persistent suffering to which the patient was doomed. The case did not at first present any sufficient grounds for anticipating the scene of anguish and death that was at so remote a period to ensue. The primary symptoms were nothing more than we often see as the consequence of long-continued exposure to cold, and the pain in the groin, complained of at first, was thought to have been produced by strain of the part whilst skating, or perhaps at the time of falling upon the ice. The sudden and almost entire disappearance of the pain from the groin, and its equally sudden reappearance within twenty-four hours, at or near the left ankle, suggested the idea of rheumatism. When, however, the skin at the seat of pain was found to be already inflamed, and the scab, with its subjacent pus, was discovered below the ankle, doubts once more arose as to what might be the future course and issue of the attack. Again, the delirium was of extraordinary character and violence, and seemed to be in no just proportion with the other general symptoms or local affection, and this circumstance, taken in connection with the oft-recurring spasmodic movements to which he had so long been subject, tended still further to embarrass the diagnosis, by suggesting violent irritation or inflammation below the base of the brain as the most rational solution of some of the more prominent phenomena observed. The symptoms, in part, bore so strong a resemblance to what has been seen in some cases of cerebro-spinal meningitis, as at one time to lead to the suspicion that this might be the real malady, complicated with local phenomena occasioned in the manner before intimated. When, at length, it became evident

that deposits of pus existed beneath the swellings upon the right elbow and left ankle joints, we could no longer doubt the existence of pyæmia, complicated though it might be with a diverse pathological condition.

The treatment before the development of pyæmia was moderately antiphlogistic, yet supporting, and requires no detail. Subsequently the medication and alimentation were, so far as practicable, tonic and restorative, quinia and iron being the principal medicines employed for this purpose. Morphia had to be freely given, and was the chief agent in procuring some respite to the excruciating pains endured by the patient.

A question of much interest in this case is in reference to the cause of the pyæmia. Had the chilliness, fever, headache, and malaise of the first day of the attack their origin in a then developing pyæmia? or was the latter subsequently engrafted upon a disturbed condition of the organism (produced by long exposure to cold), and had its origin in an accidental circumstance, such, for instance, as the purulent scab spoken of? or can such a change in the condition of the blood, from intense cold, arise, as, conjoined with bruises from falling, may have an agency, when occurring in an already disturbed state of the system, in engendering pyæmia?

Oct. 5. Deformities after Disease of the Hip-joint. (With five woodcuts.)—Dr. H. LENOX HEDGE called the attention of the Fellows of the College to some cases of deformity after disease of the hip-joint, in the following remarks:—

The ordinary deformity in bad cases, especially when badly treated, or left to themselves, is familiar to all. We see every day such children moving, as best they may, upon crutches, with the body erect, but the affected limb drawn forward and upward, away from the ground: not only useless, but liable to various injuries from its prominent position. If such a limb be examined, it will be found small and wasted. The mobility at the ankle and knee is usually normal, while that at the hip-joint is partially or oftentimes totally lost. On the outer or inner part of the thigh, in the groin or in the sacral region, depressed scars will usually be seen, marking the location of old abscesses. If the interior of the joint be looked at after death, the bones of the pelvis and the femur may be found firmly united by bony union either at the acetabulum or some abnormal position; or else the cartilaginous surfaces merely roughened, and fibrous bands existing within or outside of the capsular ligament, and the muscles, on the front and inner part of the thigh, especially the sartorius, biceps, and adductors, strongly contracted; or at times the joint itself but slightly changed from its normal condition, and the position of the limb entirely due to the contraction of the muscles.

Sometimes not only one but both hips have gone through the same disease, and a similar deformity cripples both limbs. Now the child cannot stand erect, and only after much practice can balance himself in a squatting position. Crutches are of but little service to him; few of those thus deformed can learn to use them. In this plight they hide themselves in some dark corner, or learn to crawl about upon their hands and feet. A few, after much effort, acquire the power of walking slowly and awkwardly when aided by their hands placed on a chair which they push before them; or else by their hands placed upon their knees. If one limb be much shortened by displacement of the head of the femur, or if the thigh and leg have assumed some unusual position from long-continued habit, the compensating deformities in other parts

of the body are very varied, and the attitude of the child in standing, and the efforts at walking, strange and pitiable.

I have had photographed a few of such cases which have come under my observation at the Children's Hospital, and elsewhere.

CASE I. John Henry Bryant, aged 12 years. One day, while visiting a child with club-feet, I saw a bright face in an obscure corner of the room, and upon asking, Who is that? the mother replied, "It is another of my cripples: nothing can be done for him; he hates to be seen, and hides himself away during the day." When this child was only two or three years old, inflammation of the hip joints had begun, and, passing through its stages in both hips, had left him thus deformed. A deep scar will be seen upon the outer part of the thigh; both thighs were in the same line, and at right angles to the body, in which position they were firmly fixed. The mobility at the knee and ankle-joints was greater than normal; and the muscles of the forearms, arms, shoulders, and chest, exceedingly developed. This resulted from his mode of standing and of walking. When he stood, he placed his hands upon his knees, so that his legs, arms, neck and head, were in a straight line, and represented his height. In this way he substituted his arms for his thighs and spine, and thus removed all his weight from the hip-joints. In this attitude he could slowly move across the room by raising himself on the balls of his feet, and then bringing one leg in advance of the other simply by the movement at the knee, as is shown in Fig. 1.

Fig. 1.



Fig. 2.



CASE II. William Arthur Johnson, aged 13 years. Scars and fistulous openings are seen upon the thigh and groin of the right limb. The left was perfectly sound, except that, owing to the peculiar position which he was so often forced to assume when he stood, there was great relaxation of the ligaments around the hip-joint, and great mobility there. The right hip-joint, however, was perfectly rigid, and the limb turned out

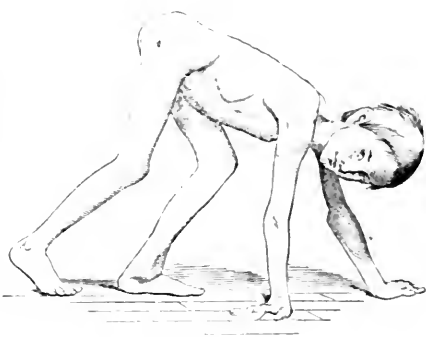
from the median line, the foot being extremely everted, and the thigh much drawn upward, so that it was at right angles to the body. When aided, he could stand erect upon the sound limb, and then the right foot would hang at about a line with his left knee, and the right knee, on a line with the pelvis, would project at the right side. This deformity resulted from his having been allowed, while in bed, during the long period of suppuration, to draw the thigh up, and let it fall upon its side. His position, when standing unassisted, was as seen in Fig. 2; the sound limb nearly vertical, and the body inclined to the right toward his deformed and everted limb, receiving support from the right arm, with the hand on the knee. He could thus, for a short distance, make some attempt at an awkward walk by swinging the deformed limb around in front of the other, thus causing him to face to the left; then carrying the sound limb forward, and then repeating the swinging movement.

CASE III. Charles Hancock, 7 years. In this case both hip-joints had lost all their mobility. The thighs were drawn up toward the body, and adducted so that the knees nearly touched each other. He could not stand alone, but with the aid of his hands resting on a chair, could hold himself in an erect position. Fig. 3 represents him in this position, and exhibits very well the concavity in the lumbar region of the spine, common to all such cases, and compensating, to a certain degree, for the angle which the thighs make with the body.

Fig. 3.



Fig. 4.

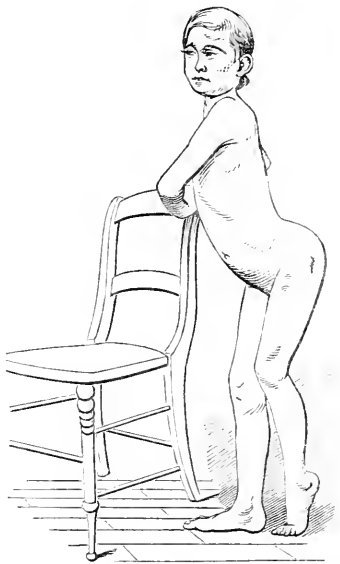


CASE IV. John Stitt, aged 12 years. With him some slight motion was still retained at both hips, but both had been long inflamed. His thighs were drawn up toward the body, and the deformity was very similar to that of Charles Hancock. Fig. 4 is of interest in showing how these poor children move from place to place; how they walk, or rather crawl. The spine, it will be noticed, is perfectly straight in this position. The curve above alluded to depends simply upon the position. The spine attains great flexibility, but does not become deformed.

CASE V. Samuel Ragan, 12 years. He had the right hip sound, but

the left hip deformed. As he stands (see Fig. 5), the concavity of the lumbar region, throwing the dorsal portion of the spine far in advance of the buttocks, exhibits the deformity, which is really due to the hip-joint. This curvature of the spine and pelvis enables him to bring the thigh nearly to the vertical line, and parallel to its fellow. The limb also is much shortened, as is seen by the knee being higher than that of the opposite side, and by his standing on the toes instead of the sole of that foot. In this way, not only did he stand, but also was able to make some movements as in walking.

Fig. 5.



The deformity in such cases as I have presented to you, increases with age. The limb, long held in an unnatural position, and seldom or never used, is slightly nourished, and soon ceases to grow with the rest of the body; the muscular tissues waste away, and lose their peculiar function of contracting at will. The fibrous bands formed around and within the hip-joint become tighter and stronger, and the member more and more useless. As the child becomes older, the sense of his helplessness and deformity wears upon his mind; nervous irritability embitters his life, and hastens the ill-health which is sure to follow close confinement in those whose constitutions have already been impaired by scrofula, or long-continued inflammation and suppuration.

At the Children's Hospital of this city, we are striving to rescue some of these poor deformed children from their forlorn condition. We find that when the deformity depends merely upon muscular contraction, and when it has not been of long continuance, it may be overcome by simple extension by means of a weight, which, after a time, may be substituted by some such splint as Davis'.

When the deformity has existed for a long time, even when purely muscular, it is advisable to etherize the patient; and as the muscles become relaxed, to straighten the limb, and then accustom it to this position by extension. But in many of these old cases, the long-continued contraction has caused a permanent shortening of the muscle. This shortening cannot be overcome by relaxation, and a subcutaneous division of muscular or fibrous tissues, myotomy or tenotomy, is advisable. When, in addition to the muscular contraction, there are fibrous adhesions within and around the hip-joints, these must be broken up by manipulation while the child is under the influence of ether. Any attempt to straighten such a limb by screws, or other mechanical appliances, simply tortures the child to no purpose.

By exercising our best care and judgment, and notwithstanding that many of our little patients have been weak and scrofulous, with an excitable nervous temperament, our operations have been uniformly successful, and the results have surprised and delighted the patients and their friends.

They are satisfied and pleased that the deformity is removed, while we hope and strive for something more. The limb ought again to become a useful member of the body. But in old cases it is very hard to teach the child to use it. Though perfectly free from pain, the muscles do not respond to the will, and all of them have lost much of their old activity. Their power can be regained only after repeated efforts. The child must be encouraged to try and try again. He must *learn* to walk. The process is a tedious one, and before it is completed some intercurrent disease may carry off these delicate little ones. In August last one of the most troublesome of our cases died of dysentery about eight months after his mother, with joy, had taken him home from the hospital free from his sad deformity.

Case of Monstrosity.—Dr. F. H. GETCHELL related the following case of this:—

On the 28th of May I was sent for to see Mrs. M——, æt. 19, who had been taken in labour, accompanied with some flooding. It was her first child. On my arrival I found the pains regular, and very severe; the os well dilated, and soft. The labour progressed slowly, but terminated without assistance in twenty hours after I first saw the patient, with the birth of a monster. It was born alive, but died in about half an hour. On examining the child I found that, besides having club-feet, and spina bifida, it had all the abdominal organs outside the abdomen, covered only by a thin serous membrane resembling the peritoneum. There was neither anus nor genital organs. I questioned the mother as to the cause of this strange deformity, but she could assign none; she expected to have given birth to a perfect child. She had felt the movements of the child up to a few hours before it was born.

Nov. 7.—Case of Leucæmia. (With three woodcuts.)—Dr. HORATIO C. WOOD related the following case:—

I was first called to see Mrs. N—— in the fall of 1865, on account of some trivial ailment. She was at that time unmarried. She was of medium height, and very robustly built, weighing about 130 pounds. She had a complexion of medium fairness, brown hair, and was, for a woman, very strong and muscular. She had been brought up in the country, having come to the city a few months previous. Her health was generally good, but she had evident signs of a serofulous taint, such as enlarged lymphatics, but had never had, that I learned, any decided outbreaks of the diathesis. Her age was 20 years; her parents were Pennsylvania German.

On the 5th of June, 1866, I was again called to see Mrs. N., who was then in the second month of her pregnancy. I found her presenting no abnormal symptoms whatever, excepting constant vomiting, which occurred not only when she took food, drink, or medicine, but also every few minutes, even when her stomach had been long emptied. There was a great deal of nausea and violent retching. The functional activity of the kidney, liver, &c., was apparently perfect. The urine contained no albumen, but was not examined for urea. Various anti-emetics were administered without effect; but on the fourth day of the attack, a blister to the epigastrium, dressed with sulphate of morphia, afforded relief. As soon as sufficiently recovered the patient went to her father's in the country, where she remained for about three months. During this time, as her mother informed me, she was constantly troubled with vomiting,

and on one occasion was for four days unable to retain anything on her stomach. Her mother stated she threw up also very dark matters. During the whole period of her stay in the country, there was but one week in which she was able to go about freely.

On the 9th of October, 1866, I was summoned to see a little cousin of hers, in whom, in a short time, well pronounced symptoms both of scarlatina and diphtheria developed themselves. He had large diphtheritic deposits, not only on both fauces and tonsils, but also on the velum, and a general scarlatina eruption, which was followed by thorough desquamation. Although desperately ill for a time, he finally recovered. On going into his room one day, when the disease was at its height, I found Mrs. N. sitting by his bedside, where she indeed spent a great deal of time both before this and during the remainder of his illness. At this time she told me she still suffered daily with vomiting and general wretchedness, although she appeared perfectly well, not at all emaciated, and was in the best of spirits. Monday evening, October 22d (a little over two weeks from her first exposure), I was summoned to see Mrs. N., and found her in bed. Her skin was in all respects normal; her pulse about 80. According to her statement, her urine was normal both in quantity and quality; her only complaint was her constant vomiting. She had no headache, although she had had some little the day previous. She positively denied having had anything like a chill. She had vomited a good deal on Sunday, but was sufficiently well to spend the evening out. The substances rejected were all *ingesta*, with mucous and watery secretion.

Tuesday morning. No change; had had a bad night, vomiting constantly; everything taken into the stomach came up instantly. There was little or no nausea between the spells, which occurred from five to twenty minutes apart, and were accompanied with violent straining. Urine passed freely and without difficulty; not decidedly diminished in quantity; normal to the eye; was tested carefully for albumen, but contained none; was not tested for urea.

Wednesday morning. Had passed a bad night, with some little tendency to wander. No essential change in her condition. About eight o'clock the previous evening her friends had noticed dark matters in the fluid thrown up by her, and these had increased constantly. Bowels not open yet, the purgatives ordered having been rejected. The paroxysms of vomiting were as violent and frequent as ever, but now were accompanied with the rejection of large quantities of watery secretion, and a peculiar black fluid resembling, in physical characters, the black vomit of yellow fever, and depositing, on standing, large black flakes, which, under the microscope, were seen to be composed of dark amorphous matter, and numerous, variously altered, and crenulated red blood-corpuscles of the same tint as the amorphous portions. The amount of this fluid thrown up during Tuesday, Wednesday, and Friday, was very considerable; frequently it came up at intervals of five minutes, and at times more than half a pint was rejected at once. During the previous day all the various anti-emetics were tried without any effect. The following drugs were among the remedies: creasote, lime-water, calomel, oxalate of cerium, ipecacuanha, sulphuric acid, sulphate of morphia, opium suppositories, &c.

Thursday morning. The patient, during the night, had shown a great tendency to fall asleep immediately after the cessation of an attack of

vomiting, and now there was well-pronounced heaviness—amounting, indeed, to hebetude. An injection, administered the previous evening, had caused the passage of lightish, somewhat clay-coloured stools (according to her mother); conjunctiva icterode; skin scarcely perceptibly yellowish; normal as to temperature and moistness; tongue perfectly clean, not dry—perhaps a little large and flabby, otherwise normal. A 12-inch Chapman ice-bag was now applied to the spine, with its upper end at about the fifth cervical vertebra. It was tried faithfully through the entire day, a half hour on, and half hour off alternately; but without any sensible effect.

Noon. Pulse 120, not feeble; no tenderness was discoverable over any portion of the thorax or abdomen. On percussion over liver the amount and also intensity of the dullness was found to be abnormally small; the upper line of dullness anteriorly was about the sixth rib; it was almost impossible to make out the lower line, owing to the colon being much distended with flatus, and the pushing up of the intestines by the gravid uterus; the lower edge of the liver was, however, certainly up under the ribs. *Evening.* General condition the same. The blister on the epigastrium was ordered to be dressed with sulphate of morphia, and an injection of ℥iiss of castor oil, and ℥ij of turpentine administered, which brought away (according to her mother) copious stools of nearly the *normal colour*, but *darker*. Some urine which I saw in the chamber was apparently thick with urates, but unfortunately I did not examine it save by inspection.

Friday morning. Marked jaundice; skin normal, save in colour; hebetude much more marked; vomiting more noisy, drier, with marked decrease in the amount of altered blood rejected. Amount of liver dullness certainly less than the previous day; no abdominal or thoracic tenderness; pulse the same; the patient's strength very good. Mercurial inunctions were resorted to, and a drop of croton oil was placed upon her tongue without effect.

Saturday morning, 1 o'clock. About an hour since patient had one or two convulsive seizures; at present, drowsiness excessive, passing into semi-unconsciousness, with great restlessness and gritting of the teeth. *2 o'clock,* patient unconscious, with terrible spells of dry, noisy vomiting every few minutes, and constant tossings, which soon after passed into fits of screaming, when she would yell so loud that she could be heard in the street a square off, at the same time wildly throwing herself about the bed. At this time she evinced great muscular power, and was so sensitive that touching her excited her very much; it became necessary to fasten her in bed with a sheet. Pulse 130, not feeble; tongue moist, not furred; no heat or dryness of skin; urine very scanty, clear, no albumen, had to be drawn off with a catheter. At consultation¹ it was decided to put the patient under chloroform, and bring about abortion.

¹ On Wednesday evening the case appearing as though it were yellow atrophy of the liver, not being willing to assume the responsibility either of a prognosis or of the feared result, I requested a consultation; and the next morning met Dr. J. M. Da Costa by appointment. The diagnosis was made out as probable yellow atrophy, and a prognosis given in accordance. At the same time the possibility presented itself that the jaundice was secondary to, and caused by the vomiting, which, in turn, was the result of uterine irritation. It was this, with the patient's strength, which induced us to attempt premature labour. Of course, it was performed with the consent of the family, who were told distinctly that even it offered scarcely a ray of hope.

The patient, although unconscious, violently resisted the administration of the chloroform—screaming, tearing away the sponge with her hands, throwing herself around, &c., but readily came under its influence, becoming quiet and utterly passive in our hands, and ceasing to vomit. The effect of the anæsthetic went off in a little while, when the vomiting, fierce screaming, and restlessness all came back as before. Chloroform had at this time no influence on her pulse; ether seemed to strengthen it.

On examination with the finger, it was found that the neck of the uterus was almost entirely softened down, and the os was sufficiently open to admit the fore-finger, and allow a head presentation to be diagnosed. Tyler Smith's method of causing premature labour was employed. The cold and hot water douche alternately were faithfully applied for several hours, conjoined with frequent irritation of the os uteri by the finger. At six P. M. but little progress had been made; the os did not feel materially different, excepting that it was now sufficiently open to admit the tips of two fingers.

About this time the cord began to protrude; the pulsations in it were very strong, showing that the child was still alive; they ceased, however, before 10 o'clock. The patient was allowed to rest until 9 A. M., when no further progress having been made, a piece of sponge-tent was introduced into the os.

Condition of patient at 9 A. M. was as follows: Jaundice increased; skin not abnormally hot or cool, rather dry, approaching a lemon-yellow colour, with purplish blotches on the limbs. Pulse 130, tolerably strong. Unconsciousness complete, with every few minutes fierce screaming fits, in which she would hurl herself about the bed, raise herself into the sitting posture, throw her arms and even feet wildly around her, and apparently try to bite those restraining her, all the time yelling and screaming so that she could be heard a square off. Very little vomiting. Pupils dilated, answering sluggishly the stimulus of light. Dulness over the liver decreased, scarcely perceptible over a breadth of two inches.

12 P. M. Pulse 130, moderately strong. Screaming fits still more violent, with great restlessness, and gritting of the teeth in the interval. Os considerably dilated. A larger piece of sponge-tent was now introduced into the os, and soon worked its way up into the uterus. At this time I drew off some 10 f $\bar{3}$ of urine which had been secreted in about twelve hours. For chemical characters of this, see hereafter.

1 P. M. Labour-pains evidently commencing.*

* 2 P. M. Pains stronger; vomiting ceased. Otherwise no change.

At 4 P. M., the head being well down in the pelvis, I applied the forceps, and, without any difficulty, delivered her of a very well-formed fœtus, which was not in the least jaundiced. The afterbirth came away immediately, the uterus contracted firmly, and no blood was lost.

5 P. M. The premature labour has apparently produced no effect; the great sensitiveness of the surface has not in the least abated, and the screaming fits are as fierce in proportion to the patient's strength as ever.

6 P. M. Mouth very dry, with sordes. Pulse 160, much more feeble. Breathing, about 36 per minute. Heart sounds feeble, approximating in character. Pupils, about as in the morning. Skin not markedly hot, dry, or cool. Patient's strength evidently failing, although no greater quietude. Shortly after this there was a sudden change for the worse;

the pulse ran up above 200, the skin grew cool, and the marks of approaching death became visible. There was no calm at the last, but life went out amidst wild groanings and stormy tossings, about 10½ P. M.

Desiring to have the urine examined by a thorough practical chemist, I submitted it to Prof. J. M. Maisch, of the Philadelphia College of Pharmacy. The following is his report:—

“*Colour*, deep brownish-yellow. *Sp. gr.*, 10.20. *Reaction*, slightly acid. It was mixed with three times its bulk of absolute alcohol, whereby a dirty-white precipitate occurred: colour of the mixture, light wine yellow. The precipitate thus occasioned was dried; then boiled with a small quantity of water, and filtered while boiling hot. A deposit occurred on cooling, consisting of a white powder, which, when carefully heated, fuses somewhat, decomposes, and leaves charcoal, which is gradually consumed, leaving no residue. The deposit dissolves in a larger quantity of water, the solution yielding no precipitates with metallic salts. Evaporated with dilute nitric acid, no solid residue is left behind.

“This behaviour corresponds with that of *leucin*. Liebig’s test to produce valerianic acid by fusing with hydrate of potassa could not be applied, owing to the small quantity of material. These reactions indicate likewise the *absence* of *Tyrosin*.

“The liquid left after separation of *leucin* by the boiling water, showed, by the usual tests, the presence of *sulphates* and small quantities of *phosphates*, but a total *absence* of *chlorides*. Slowly evaporated, the liquid left a crystalline mass consisting chiefly of *uric acid*; the edges of this crystalline mass consisted in part of thin prismatic crystals, apparently *leucin*. This crystalline residue was tested for *tyrosin*, without success, by the following methods: Scherer’s test (with nitric acid and soda); Piria’s test (production of sulpho-tyrosinic acid); and R. Hoffmann’s test, as modified by L. Meyer (dento-nitrate of mercury and nitrous acid).

“To sum up, the precipitate occasioned by alcohol in the urine contains: *Leucin*, *uric acid*, *sulphates*, and small quantities of *phosphates*.

“The alcoholic liquid separated from this precipitate was treated with subacetate of lead, the precipitate filtered off and washed with alcohol.

“The precipitate, which was of a light fawn-colour, was decomposed by sulphuric acid in the presence of alcohol, filtered, and the filtrate carefully evaporated: a deep brown mass remained behind, without any sign of crystallization. Tests were applied, with negative results, for biliary acids, biliary colouring matter, chlorides, sugar, and urea; but a small quantity of phosphoric acid was observed by the proper reagents. The precipitate occasioned by subacetate of lead in the urine, previously precipitated by absolute alcohol, therefore consists chiefly of *phosphoric acid*, *urinary extractive*, and *colouring matter*, in combination with lead.

“The filtrate from this precipitate was treated with sulphuric acid to remove the excess of lead added, and the filtrate from the sulphate of lead was carefully evaporated: a syrupy brown-coloured mass remained, in which no sign of crystallization could be observed; it was diluted with little water before the following tests were applied: With nitric and oxalic acids no indications of the presence of urea were obtained. With nitrate of silver a minute turbidity of *chloride* of silver was occasioned. Pettenkofer’s test carefully applied, gave a faint but readily observable change of colour characteristic of the presence of a trace of *biliary acid*. Trommer’s and Boettger’s tests indicated the presence of a little *sugar*. The liquid remaining after the application of these tests was concentrated

and again tested for urea without avail. The filtrate from the precipitate occasioned by subacetate of lead in the urine, previously precipitated by absolute alcohol, contains *extractive*, *little sugar*, and traces of *biliary acid* and *chloride*, but no *urea*, which ought to have been contained in this portion of the material.

"In regard to the course of analysis pursued, I desire to state, that I carefully avoided, in all the different manipulations, *all* oxidizing and de-oxidizing agents. The *total absence of urea* in that portion of the liquid where I had a right to look for it, was so unexpected to me that I devoted a portion of the urine, reserved in the beginning, to again test for it. It was evaporated with care, and tested in the usual way with all the necessary precautions, but it could not be found.

"I regret very much that the amount of this urine (scarcely one and a half fluidounces) was so small as to preclude the possibility of submitting larger quantities to processes for preparing some of the compounds tested for. I refer particularly to Tyrosin and biliary colouring matter. The former, if present at all, could be contained in the urine merely as a very minute trace, because none of the tests gave any indications of it in that portion of the separated constituents which ought to have contained the whole amount originally present in about six fluidrachms of the urine. Regarding the colouring matter of bile, its rapid decomposition in contact with air and during chemical manipulations, is sufficient to explain the negative results, particularly in view of the mere trace of biliary acid observed."

Perhaps it will be useful to sum up in a few words the history just given in full, and then to point out some peculiarities in the symptoms. A robust lady, twenty-one years old, near the end of the sixth month of her first pregnancy, during which she has suffered very much from severe, persistent vomiting, and has had one or two attacks threatening her life, is seized with symptoms precisely resembling those of her previous attacks; but instead of their yielding to treatment, they constantly become worse and worse, jaundice sets in on the third day, *without any fever or heat of skin*, percussion dulness over the liver lessens, symptoms of blood-poison appear, and she dies on the fifth day in a state of wild, unconscious delirium.

The general features of the case are those portrayed by Prof. Frerichs in his account of acute atrophy of the liver. None of the characteristic symptoms were wanting, excepting the deposition of a crystalline deposit of leucin and tyrosin in the urine; a chemical examination, however, of that fluid proved that leucin was largely present, though not in sufficient quantity to deposit spontaneously. Although the agreement was so complete as to identify fully the affection, yet there were some peculiar symptoms in the case which it is well to notice, to aid us in sifting out the diagnostic from the incidental symptoms of this disease.

There were no hemorrhages (except from the stomach) or petechiæ.

There were none of the peculiar oscillations of the pulse so universally observed by Prof. Frerichs.

There was no abdominal tenderness or pain.

Very few biliary products (acids or colouring matter in the urine), and tyrosin was, if present, only a trace, and there was not, at any time, a greenish sediment.

There was no headache, and not the slightest depression of spirits before or in the earlier portions of the attack.

The black vomit appeared before the jaundice, which in turn preceded all decided nervous symptoms.

Autopsy about fourteen hours after death.—Cadaver well formed; not at all emaciated; the breasts and limbs very well developed; a general bloodlessness of all the tissues very noticeable.

Thorax.—Heart rather large, its walls rather thick, with a slightly yellowish or buff-coloured tint; right ventricle containing a soft, illy-formed black clot; left ventricle without one. Muscular tissue, under the microscope, very much altered; the transverse strie of the fibres generally having entirely disappeared, and the well-defined margins being lost. Occasionally a well-preserved fibre would offer itself, but almost the entire mass of the bundles were in an advanced stage of degeneration, presenting a granular, illy-defined structure, with innumerable small and large oil-globules through them, and longitudinal strie merely indicating the lines of separation of the primitive fibres. Under the action of acetic acid they became more transparent, and the vast number of oil-globules stood out in strong relief.

Fig. 1 represents the muscular tissue unaltered by reagents. Fig. 2 represents the shreds of tissue after the action of glacial acetic acid.

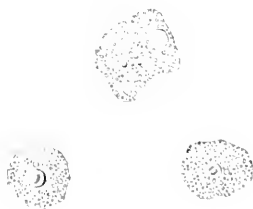
Fig. 1.



Fig. 2.



Fig. 3.



Lungs, to the eye, nearly normal; rather dry, presenting here and there patches of dark venous congestion, especially posteriorly, but mostly pinkish, everywhere crepitant. Not examined microscopically.

Blood obtained from the right ventricle, under microscope, presented nothing abnormal; when dried on a slide, no crystals were obtained.

Abdomen.—Liver remarkable for its excessive thinness, sharp edges, and its flabby texture. Very high up, its lower edge scarcely reaching to the ninth rib; of a yellowish colour, with a close, bright-red injection of the capillaries of the whole surface; on section, of a dull orange colour; no appearance of the lobules visible. Weight 2 lbs. 6½ oz. av.; circumference 29 inches; long diameter 10¼; greatest transverse diameter 7½; at the fissure, 6 inches; greatest thickness through right lobe, 1½ inches; thickness of left lobe 2 inches from the edge, half an inch.

Gall-bladder full of bile; cystic, hepatic, and common ducts all per-

fectly pervious, as was proven by dissecting them out, and passing a probe through them.

On microscopic examination scarcely a trace of cell structure could be found. On a number of slides examined I found but a single cell, and that in a very advanced state of degeneration. Everywhere were myriads of oil-globules of all sizes, with granular matter. No crystals of leucin or tyrosin could be found.

Spleen.—Weight 71 oz.; colour rather darker than normal. Tissue decidedly softened; very friable. When a little of the pulp was placed under the microscope, numerous cells, of various shapes and sizes, filled with granules and oil-globules, and indistinct elongated bodies containing numerous granules, probably the remains of the so-called “caudate corpuscles” of the spleen filled the field of vision.

Kidneys.—Length $5\frac{1}{4}$ inches; breadth (at centre, from inner edge of hilum) $2\frac{1}{2}$ inches; thickness $1\frac{3}{8}$ inches; weight of one 6 oz. av. On section, cortical substance with a decided light yellow tint; pyramids reddish, with longitudinal streaks of darker red. The pelves of both kidneys were filled with a milky fluid, which the microscope showed to be composed of innumerable large, pavement epithelium cells, in every stage of degeneration. These must have come from the mucous membrane of the pelves themselves, and possessed the general characters of such cells, but were filled with granular matter and large and small oil-globules. (See Fig. 3.)

On microscopical examination the secreting tubules were everywhere found to be gorged with oil-globules, great and small, to the very uttermost. The secreting tissue appeared to be entirely destroyed; large oil-drops, still retaining the shape of the original cell, were the only indications of the normal gland structure that I could find.

Supra-renal capsules rather larger and softer than natural, and of a very decided yellowish tint; not examined microscopically.

Peritoneum injected.

Stomach.—Mucous membrane thickened and softened; much injected, more especially on the larger curvature near the pylorus, where there were numerous small ecchymoses of the, apparently, same dark substance so plentiful in the matters rejected.

Duodenum.—Mucous membrane softened; otherwise normal to the naked eye.

Ovaries.—Normal in general appearance, as well as in their microscopic structure, one of them containing a very well pronounced *corpus luteum*.

Uterus.—Muscular tissue seen, under the microscope, to have undergone a similar change to that of the heart-structure, although not to so great an extent. There were some oil-globules and granular matter, with a marked loss of definiteness of outline.

Remarks.—In regard to the nature of the terrible disease under consideration a number of theories have been advanced, prominent among which have been those which assume a “bilious liquefaction”—a melting down of the tissue in an excess of bile in the blood of the portal vein (Rokitansky), or in the biliary ducts and liver cells (Hensch, Von Dusch). Such suppositions seem to me so monstrous—the idea of living cells melting away in their own secretion so opposed to all modern pathology—that one almost wonders that Professor Frerichs should pause to demolish them as he does.

There is one explanation of the disease, which, from the source of its origin, and especially from the credence which it has gained, challenges our serious attention. Dr. Bright, of London, was, I believe, the first to advance it (*Guy's Hospital Reports*, vol. i. pp. 624-632), and it has been more or less fully adopted by most of the modern writers (*Frerichs*, Erster Band, p. 257; *Wood*, vol. ii. p. 576; *Aitken*, vol. ii. p. 834; *Flint*, &c.). The theory alluded to is, that the structural change of the liver is caused by some form of inflammation. Before discussing this idea of the nature of yellow atrophy, it is worthy of remark that its author, Dr. Bright, failed to grasp the peculiar, characteristic features of the affection, as is shown by his grouping under one head cases of this disease and others which were essentially different. Thus his first two cases (*Guy's Hospital Reports*, vol. i.) were simple jaundice, as it is very commonly seen, probably arising from a catarrhal inflammation of the gall-ducts, or even from a want of functional activity of the liver-cells. His third case was the result of external violence, and seems to have been an inflammation of the peritoneum, and cellular and possibly glandular structure of the viscus. The fourth case was probably the hob-nailed liver. Certainly, as he himself states, there was some chronic disease of the organ, so that it is almost impossible to decide the part the acute disease played, or whether there was any acute disease different from the chronic affection. His fifteenth and sixteenth cases appear to have suffered from the so-called acute atrophy. In his seventh case the liver was full of small abscesses; in his own words there was a very general inflammation of the substance of the liver, connected with the presence of gall-stones. The eighth case was one of "extensive suppuration of the liver."¹ These eight cases, he then says, may be considered as forming a kind of series of what may be called inflammatory, or perhaps idiopathic jaundice; but, as just stated, they are instances of at least five essentially different diseases. Surely, this being so, we can throw off any weight of authority which may belong to the inflammatory theory, especially as the best of the modern writers accept it, as it were, under protest.

According to the best developed phase of the inflammatory theory, the affection has its origin in a diffused inflammation of the glandular structure of the liver. Let me quote the words of Frerichs, as translated by Dr. Murchison. He says (p. 229, Eng. translation): "This theory was first enunciated by Bright, who described cases of the disease under the appellation of hepatitis; in recent times, Engel, Wedl, and Bambuyer, have subscribed to it, and have explained the destruction of the cells by a fatty degeneration arising from an acute exudation process. Although I have some hesitation in identifying the destruction of the hepatic cells with fatty degeneration, still I cannot but adhere to this view in so far that, according to my experience, an exudation-process constitutes the starting-point of the disease. On close examination of a liver which is undergoing acute wasting, portions are found, mostly in the right lobe, in which the morbid process has not run its entire course. We here

¹ I have been thus detailed, not so much for the reason indicated in the text, as to illustrate the way in which this affection has been confounded with others by the older writers. All the observations made prior to the appearance of Frerichs' book are of but little avail, since it is rarely certain that the cases are really those of acute atrophy. In endeavouring to arrive at a true idea of the nature of the affection, it seems to me a vital point first to eliminate all doubtful cases: under which head I would class all in which there is not distinct notice of the presence of leucin or tyrosin in the urine or liver.

observe not merely a remarkably congested condition of the capillaries, but in the circumference of the lobules, broad, gray bands, consisting of finely granular matter with isolated cells undergoing disintegration, while the cells nearest to the central vein still continue normal, except that they are infiltrated with bile." Allowing this last observation to be strictly correct, is it proven that this gray matter is an exudation product? In the liver of the case herein described no opportunity was presented of confirming or disproving the faithfulness of the observation—all parts of the liver seemed equally destroyed. Yet on section the liver seemed to be largely composed of grayish granular matter, and I confess that the contents of the one or two cells seen by myself appeared to be identical with this external material. For this reason I would incline to consider that these broad gray bands were the *result* of the *cell disintegration* going on in their midst, not a primary exudation—the cause of the cell change. Be this as it may, allowing the first step of the morbid change to be an exudation process, it is no proof that the process is inflammatory. Is tubercular disease inflammatory? and is not an exudation the first local manifestation? Yet this is almost the only shadow of a proof of the truth of the inflammatory theory. It appears to me, therefore, that this hypothesis bears upon its very face the Scottish verdict of "*not proven*;" and more than this, I hope to adduce proof of its falsity.

In the first place *fever* is *not* one of the symptoms of the affection, although so stated in some of the recent text-books. Frerichs says (Eng. trans. p. 217): "Along with the colour, the skin was usually cool, dry, and inactive; in none of my own cases was any elevation of temperature observed. Alison and Bright likewise make particular mention of this circumstance."¹

In the case herein described, one of the most striking features was the coolness of the skin, which was observed in *all stages* of the disease, and was accompanied, until the last few hours, with a moist, normal tongue, on which not an epithelial cell seemed ruffled; in a word, there was not a trace of a febrile movement, and this in a tolerably robust patient. May we not then set down as a character of the disease *absence* of fever? Now is it conceivable that if so large a gland as the liver was so intensely inflamed as to totally destroy it in four or five days, the system would not sympathize with it sufficiently for fever to be excited?

Secondly. Not only is fever wanting, but the peculiar local characteristics of inflammation are not present. We have not only no proof whatever, but there is no reason for supposing that there is any enlargement of the organ at any stage.

Even tenderness and pain are frequently wanting. The violent retching must of necessity cause some degree of soreness; yet, in Mrs. N. firm percussion over the liver produced no uneasy sensation whatever as long as she was conscious. Afterwards it was not tried, since touching the patient anywhere produced so much excitement that it would have been impossible to judge of the results.

The general and local symptoms differing thus *in toto* from those of inflammation, what shall we say as to the structural lesions found on *post-mortem* examination. Not only can we say with Prof. Wood, "The results of the disease are quite different from those exhibited in any other example of hepatic inflammation;" but also that they are totally unlike

¹ In very thin sections the yellowish colour was scarcely apparent.

those of acute inflammation in any organ whatever. Allowing, for argument's sake, that the change is a mere fatty degeneration, where do we have even fatty degeneration occurring as the result of an inflammation of a few days' standing? Further, is not the metamorphosis more than a mere fatty degeneration? Even Frerichs is forced to admit this. Is it not an organic change—*sui generis*? Blood loaded with leucin and tyrosin, a liver tissue studded with crystals of the same—surely these are not the accompaniments of a mere fatty degeneration. Prof. Wood (*Pract.*, vol. i. p. 124), in speaking of tubercle not being the result of inflammation, says: "But a sufficient refutation of this opinion is, that in a vast number of cases tubercles exist without any inflammation whatever, evinced either by the symptoms or by post-mortem anatomical examination." So I would sum up our past argument; shall we grant the proposition in the one case and not in the other?

But even stronger and more convincing is the fact that the liver is not the simple seat of the disease, and probably is neither so over nor more terribly involved than other vital organs, but merely partakes of the prevailing dyscrasia.

Jaundice is one of the most prominent symptoms of the affection, and as it is generally connected with disease of the liver, the attention of observers has been attracted to that organ, where the terrible lesions found have riveted it, and caused them to overlook important lesions elsewhere; still almost every one has noticed that the kidneys were diseased. The German professor, alluding to these organs, says (Eng. trans. p. 227): "Besides the deposit of pigment dependent upon the jaundice, I have found the glandular epithelium infiltrated with granules, and in most cases in a state of fatty degeneration, and the tissue itself flabby and shrivelled." (*Das Gesehe schlaff und welk*, p. 235, Erst. Band.) He further states that they have not received the attention they deserve, which seems true of all the organs except the liver. One of the most significant symptoms of the disease is the absence of urea from the urine, which, with the presence of urea in the blood, is irrefragable proof of utterly perverted cell action in the kidneys. Is not the retention of urea in the blood fully as serious as the retention of the bile elements—concerning which Frerichs says: "I do not here refer to the presence of the constituents of the bile, of the harmlessness of which I have convinced myself by a long series of injection experiments." The symptoms of the last 48 hours of Mrs. N. were precisely those of uramic poisoning: the restlessness, gritting of the teeth, wild convulsive tossings, fierce screams, and utter unconsciousness, were all in perfect agreement. The microscopical examination of the kidneys proved that in her case their glandular element was as completely destroyed as that of the liver: tubules completely stripped of secreting epithelium and everywhere gorged with oil and granules, marked the common wreck. Can it be said that this death of the cells, this complete degeneration of the secreting tissue, was caused by an effort to eliminate bile poison? It seems not. The case lasted but four or five days, and at no time did the urine contain biliary colouring matter in any amount. Is not the fact of the non-presence of the bile pigment in the urine when it was loading the blood, dyeing the tissues, and oppressing the nerve-centres, fair proof that the secreting cells were already altered: that the kidney lesion was at least contemporaneous with that of the liver? It seems to me, in view of these facts, it would be as proper to call the disease acute atrophy of

the kidneys, or acute uræmia, as acute atrophy of the liver or acute jaundice.

I have no doubt the same change took place in the supra-renal capsules. Unfortunately, I did not at first suspect the universal alteration of cell-structure that prevailed, and these organs were not preserved for microscopic examination; but they had the peculiar appearance and softening of other organs. The mucons membrane of the pelvis of the kidneys was the only one whose epithelium was examined with the microscope. The cells were undergoing the characteristic change; they were gorged with granules and oil-globules of various sizes. The spleen tissue had not escaped; its cells were everywhere undergoing the same destructive metamorphosis; the so-called caudate corpuscle appeared to be almost entirely destroyed, or only represented by elongated formless masses of granules. Even the muscular tissue of the uterus had suffered. The heart-fibres were very far advanced in the same destruction. In short, not only were three of the most important glands destroyed, but pavement epithelium and striated muscular tissue were equally blasted. It might be argued that these were mere accidental changes in a single case. This has been answered for the kidneys. The patient was one of the last in whom a fatty heart might be looked for—young, robust, muscular. More than this, it seems evident that the same degeneration of heart-structure existed in Frerichs' cases. It is very evident from the text of his work that Professor Frerichs did not examine the heart-tissue with the microscope. In Mrs. N.'s case the heart was pronounced to be healthy, before the microscope revealed the change. Would it be an unfair inference, that if the German Professor had examined the heart-tissue, he would have found a similar degeneration? But we are not left to mere inference, for fortunately his acute observation noted abnormalities which he failed to appreciate. In describing the appearance of the liver to the eye, his favourite expression is, "*schlaff und welk.*" It occurs over and over again, and is applied almost as freely to the heart-tissue. Thus, in the account of the autopsy, Obs. 14 (Erster Band, p. 210), occur the words *Das Herz schlaff und welk*; and a little further on, *Die Leber schlaff und welk*. In summing up the pathological changes of the disease (Erst. Band, p. 235), he gives as a constant lesion, "*die schlaffen, welken Bewesenheit des Herzmuskels.*" Taking these facts into consideration, it seems evident that in this disease there are consentaneous and identical structural changes in a vast number of important organs—changes, moreover, which are peculiar to the disease—totally different from those occurring in any other known affection. Is it conceivable that the links of this morbid chain should have been forged by one of their own number; that the starting-point of change so wide-spread should be a mere local disease, which in a day should involve almost every structure of the body. Can this be? It would seem not. Are we not forced to acknowledge that in the so-called yellow atrophy of the liver we have a constitutional affection of which the various structural changes are merely the local manifestations?

Considering this to be really the case, the question arises, what is the nature of the disease? Of the ultimate nature—the essence—of the various constitutional diseases we know little or nothing. All that is in our power to do, is to arrange them so as to obtain groups, the individual numbers of which are similar or in their nature identical with one another. Of all these groups the one which presents most evidently a defi-

nite idea outcropping amidst various conditions—which represents most closely a *genus* of naturalists—is the FEVERS. To this well-marked group it seems to me impossible to refer yellow atrophy.

In the first place, the most manifest and constant symptom of these diseases, that from which they derive their name—*i. e.*, *fever*—is wanting, in yellow atrophy. Secondly. All of the fevers evidently arise from the action of some specific poison derived from without, whilst in the history of the reported cases of acute atrophy there is nothing which can lead us to suspect a peculiar poison. This argument is, I am aware, not a very strong one, since so much obscurity still shrouds the origin of yellow atrophy, and yet it has seemed to me to have some force, for if there was a definite fever poison introduced into the blood from without, the disease has certainly been sufficiently studied for some of the laws of the development of the poison to be made out.

A third reason of some force is the non-contagiousness of the affection. The fourth and apparently decisive argument against the supposition that it is a fever, is derived from the fact that there is no constitutional symptom of any moment until after the destruction of gland tissue has gone so far that there is evidently blood poisoning from retention of effete substances. It is well known that in the various fevers we have evident symptoms of poisoned blood, long before the characteristic local lesions are fully developed. Thus, there are aches in the loins, back, and head, chills, fever, hot skin, dry tongue, generally perverted secretion, evident manifestations of a disturbed nervous system, and all the numerous symptoms which make up the whole of an ordinary fever; but in yellow atrophy of the liver all these are either totally wanting or else do not appear until after, and as an apparent consequence of the local disease.

If it be not a fever, what is it? It appears to me to be a member of that class of constitutional affections to which tuberculosis belongs—a rather illy defined group of affections characterized by the absence of fever and inflammation as necessary symptoms, and the magnitude of the local lesions. More in order to render my view of the pathology of this disease definite, to make any misunderstanding impossible, than with the idea that the name will not be superseded by a better one, I venture to propose to call it *Leucinosi*, since that substance is one of the chief products of the disease. If Professor Frerichs is right in his belief that the first step in the morbid local change is throwing out of a peculiar exudation, it will very strongly corroborate my view of the disease. If the possible explanation of the gray bands, given a few pages back, be found hereafter true, does it alter the case? Is it utterly disproven that even tubercle itself is the product of cell degeneration?

The only objection which occurs to my mind to the view advocated in this paper is the rapidity of the course of this affection. Granting that the disease really commences when it apparently does, if we take into consideration the number and importance of the organs concerned and the method of attack, is its course so very much more rapid than is seen in some cases of acute phthisis? In the latter affection only the lungs are attacked, and they are of such nature that immense alterations may and do take place in their structure without the suspension of their functions. In this disease, however, the organs are so attacked that their function almost immediately ceases in the part diseased, and that cessation means death.

And yet I cannot avoid here expressing a strong suspicion that the disease is not so rapid in its course as it appears; that in fact the local change goes on silently for some time before the final outburst, making a slow and sure headway—riddling the organs perhaps with disease, and yet leaving sufficient of their structure intact to prevent the induction of any very manifest symptoms until, having obtained a foothold, the local disease suddenly and rapidly increases, advancing, it may be, simultaneously from innumerable centres, and producing the characteristic symptoms of the affection. We all know how latent tubercle often is. The history of the case herein described lends sufficient probability to this surmise to make it worth while in similar cases to watch carefully for some decided proof one way or the other.

This much is certain, the patient had been vomiting constantly during her pregnancy to an extent rarely seen; that she had had two attacks closely simulating the earlier part of the fatal one, and according to her mother, in the second of these attacks (which occurred in the country), had thrown up black matters like those rejected in the fatal seizure, all these symptoms occurring without the urine being albuminous.

If ever I should meet with a similar case, I would certainly test quantitatively the urine for urea, and would consider a *lessened excretion of urea* with a *non-albuminous* condition of the urine as very grave symptoms, and if *traces of tyrosin or leucin* could be found, it seems to me that almost positive proof of the commencement of the affection would be afforded.

Dr. DA COSTA said that he had listened with a great deal of interest to the remarks of Dr. Wood; and that the thoroughness with which the case had been investigated certainly rendered it a valuable addition to the literature of the subject. Yet there were some points that had been advocated which seemed to him to admit of a different explanation; and there were others which grew out of a consideration of the case, to which he begged to call the attention of the College. And in the first place it appeared to him that many instances of acute atrophy that had been reported could not be explained on the supposition of a diathesis. For instance, acute atrophy has been known to have ultimately followed obstruction of the bile ducts from cancerous deposits in the duodenum (as in Observation No. XIX. of Frerichs); or cirrhosis of the liver (as in Observation XXI., in which leucin was found in the blood and urine). It has, therefore, clearly been a sequel to cases in which the liver was already diseased, or at all events seriously interfered with in its functions. Again, what becomes of the examples of acute atrophy produced by mental emotion, such as have been described by Morgagni and others? To cite the case, so well known in medical literature, of Boerhaave, of an officer who receiving a blow was prevented by bystanders from obtaining revenge with his drawn sword, and who became jaundiced and died shortly with signs of the most marked cerebral disturbance. It is true that in some of the older cases the diagnosis of acute atrophy may be called into question. But among the most recent observers violent emotions are admitted as giving rise to the disease.

A view of the subject suggests itself that, while fully admitting the more general changes in tissue, which the case before the Society has so satisfactorily proven, yet does not set aside the primary difficulty as being

in the liver. It is to suppose that these changes in other organs are produced by the altered composition of the blood—altered by the products it retains—and the disordered nutrition thus caused, fostered perhaps by the disturbed condition of the nervous system. That these structural metamorphoses would have to occur very rapidly is not an argument against this view; for do we not find in diseases running as rapid a course, and in which the blood is greatly altered, extensive tissue alterations? We know, for instance, that in yellow fever the liver is yellow, and its secreting cells filled to the utmost with fat; that it has, in other words, undergone an acute fatty degeneration. This change, first pointed out by Dr. Clark, has been constantly noticed by the speaker; but he has also found it to be associated with a granular condition of the muscular fibres of the heart, and even of the minute structure of the kidneys.

And while referring to kindred changes in yellow fever, the great similarity of the phenomena of this malady to acute atrophy may be mentioned. Not only does this similarity show itself in the pathological state just mentioned, but in the accumulation of urea in the blood, in the colour of the skin, the character of the vomit, and of other symptoms, and in the rapid progress of the disease. We can thus understand how it has happened that epidemic jaundice of grave type, amid which cases of yellow atrophy have occurred, should have been considered as yellow fever, and even—as in the notice by Garnier-Letenrie of the epidemic of jaundice in the French army of occupation in Rome, in 1849—be considered as identical in etiology.

There is, lastly, one more point which the consideration of the case before us suggests: that many of the symptoms, particularly the abnormal nervous symptoms, are in great part due to the non-elimination of the urea. And here, again, we find that the presence or absence of albumen in the urine has little or nothing to do with the question; and that in cases of suspected uræmia the urine must be specifically tested for urea without reference to whether or not it contains albumen. But to this point Dr. Da Costa stated that he had elsewhere called attention.

Paraplegia without Discoverable Lesion of the Brain or Spinal Cord.—
Dr. ISAAC NORRIS read the following account of a case:—

The interest, as well as the remarkable results of the post-mortem, he stated, must be his excuse for drawing the attention of the College for a few moments to it.

The patient, aged 45, had been for some time Orderly Sergeant of Co. E, 26th Pa. Vols., and, for bravery in the field, had been promoted to the position of First Lieutenant of his company.

At the battle of Chancellorsville, he was wounded in the left side, the ball passing in above the hip. From the fact of the wound being often inflamed, and never ceasing entirely to give him trouble, it is questionable if the ball was removed, at least entirely. The patient was unable to give any definite information on the subject.

At the battle of Gettysburg, to which he hastened when it was known that his regiment was likely to be engaged, with the usual bravery of the American soldier, although still suffering from the effects of his wound, he was unfortunate enough again to be shot down, this time receiving the wound in his left leg. The limb must have been considerably shattered, for it was eventually necessary to amputate it about a month after the

injury, every attempt being made in the mean time to save it. Conservative surgery failing, it was amputated at the upper third at Little York Hospital, Dr. Snyder being the attending surgeon. After remaining there some months, he expressed a desire to go home, and was ordered to Philadelphia; he was sent by the Medical Director to Camac's Woods, where he remained, receiving the best care that the resources of a great city could command, until, the time of his regiment expiring, he was mustered out of the service. In process of time a limb was fitted to the stump, the result of a flap operation, and with practice he soon learned to walk on it, nearly as well as before the operation.

On the 19th of September, 1866, as he was returning home from receiving his pension, his wife first noticed some peculiarity in his gait, and the difficulty he experienced for a moment or two in walking, which would then go off, and remarked that some uncharitable persons not knowing the case, might think him intoxicated. This difficulty continued to increase, but he thought it was nothing, and would soon wear away. A carpenter by trade, he had given up the business since the war, and was employed at the gas works to superintend the meters; now walking from his residence, 21st and Locust, to the works at Market Street bridge, and back, daily. This he soon found quite a task, and, as he noticed each day that it became a more difficult one, he applied to me to give him, if possible, relief. Thinking the exercise beneficial, I did all I could to induce him to use the limb, and recommended also a douche of cold water, the reaction being very grateful to him. Rubefacient liniments were also applied and flannel worn next the skin. As tonics, quinia and iron were employed, as well as strychnia, this last being given not only by the stomach, but also endermically, and I thought with happy effect. The promptness with which it can be made to act renders this method a favourite one with the discriminating physician. Reading in a French author some years ago, of the beneficial effects derived from ergot in like cases, I was induced to try it here, but could not perceive any effects from it. Cantharides was also tried, but without any great benefit. The strychnia seemed to act best, and the patient was at first quite amused at the little twitchings and involuntary contractions of the muscles caused by it, especially in the amputated limb, showing that he was fully under the influence of the drug. A generous diet was also insisted upon.

Finding the trouble increasing, and that he was slowly losing the use of the limbs, a cane at this time being necessary whenever he attempted to walk, the battery was tried, and for a time with good effect. He soon got used to it, and it was then necessary greatly to increase its power to produce any effect. The lower extremities began now to be but appendages to the trunk, nearly all sensation and power having left them. That the trouble proceeded from the spine I think was proved by the irritability being so greatly diminished instead of increased, as one would have expected if the cerebrum had been involved, a distinction first pointed out by Dr. Marshall Hall. His memory also was excellent.

Being now unable to walk except with the aid of crutches, and there being some difficulty about the battery being applied daily, I recommended his seeking admission to the Pennsylvania Hospital, where he was received, and remained some weeks, his condition not improving. Becoming dissatisfied with his hospital life, and believing that his death was close at hand, he returned to his home, and again placed himself under my care. In the short time during which I had lost sight of him, he had become

very much worse, and I deemed it my duty to acquaint the family with the probable result of his case. At this time he was paralyzed as high up as the breast, the abdomen being much swollen and tympanitic. He swallowed anything with great difficulty, and a little wine and beef-tea was all I could get him to take. The pulse was very feeble, and he had considerable difficulty at times in articulation, which was evidently attended with pain. The memory, and his other faculties, I did not find impaired in the slightest degree during the disease. Entire loss of sensation now existed in the limbs and lower part of the trunk, the feces and urine coming away involuntarily. The catheter, however, had occasionally to be introduced. To add to his troubles, distressing bed-sores had made their appearance, and my great object was now not so much to prolong his life, as to alleviate his sufferings, the former having ceased to be desirable. Death took place Nov. 30th, or a little over two months after his attention was first drawn to his disease.

The patient believed that the amputated limb was entirely the cause of his trouble, and from the neuralgic pains he experienced in it from time to time, the supposition was a very natural one; but the first wound in the side may, after all, have been the real cause of the difficulty. As I have said, it never ceased to give him trouble.

Owing to a misunderstanding, I was not present at the post-mortem, which was performed by Dr. Hare, but from notes of the case taken by Dr. William Pepper, I am indebted for the following details:—

“Only the brain and spinal cord were examined, as it grew so dark that it was impossible to continue the work, and perfectly incredible as it seems to us in the light of former experience, there was absolutely no recognizable lesion of any part of the nervous system. The spinal plexus of veins was much congested, and in one or two places the cord itself seemed too full of blood and perhaps a little stained; but the membranes were clear and smooth, the vessels of the cord healthy, the nerve tubes normal, and the nerve cells in the gray matter of the cord especially healthy. The brain tissue was also healthy. Where then are we to seek for the cause of these cases? It may be that if we had been able to make a minute examination of the ganglia of the great sympathetic nerve, we should there have found some morbid alteration to account for these otherwise unaccountable phenomena.”

Splint for Incipient Hip-Joint Disease.—Dr. PACKARD exhibited a splint employed by him in a case of this kind, in which it was highly desirable that the patient, a boy five years old, should move about, and at the same time that pressure should be taken off from the hip-joint.

The child, when first seen, was pale and somewhat emaciated, with great nocturnal restlessness; the limb was drawn up and much wasted. He had received several blows and falls upon the knee and hip. Extension by means of adhesive plaster, and a sand-bag attached to a cord playing over a pulley, was used, with general remedies, until the child improved very much, and became anxious to go about. The great irritability of the adductor muscles forbade the use of the ordinary forms of splints, with a perineal band. The splint represented in Fig. 5 was therefore made by Kimball & Co., 631 Arch Street. It consists of a trough or posterior socket of vulcanized rubber (*a*), on the rounded upper edge of which the tuber ischii and buttock may rest as on a chair. This is retained by a

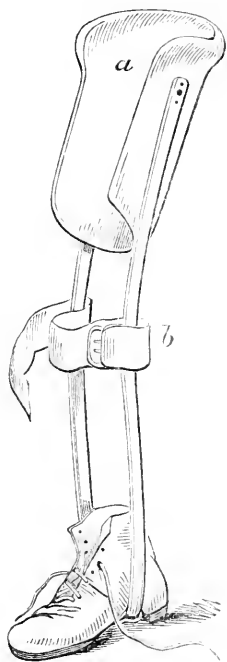
lacing in front of the thigh (omitted in the drawing for the sake of clearness); and to it is fixed on either side, by a pivot, one end of a steel bar as light as possible to be strong enough to support the child's weight. The middle of this bar, rounded, is hinged beneath the sole of the shoe, and its two upper portions are slightly bent at the knee, so as to allow the child to sit down more conveniently. A double band (*b*) prevents the knee from coming forward too much.

When this apparatus is applied, the patient's weight is balanced on the upper rounded edge of the hard-rubber trough, and the acetabulum is entirely relieved of pressure. A little practice enables him to sit alone, as it were, with great ease and readiness. The heel is also brought down very efficiently.

Care must be taken to attach the upper ends of the bar to the hard-rubber trough at a point high enough up and far enough back, otherwise the latter will tend to rock backwards under the weight of the body, and the patient might even be in danger of having the thigh-bone broken by the pressure forward of the lower end of the trough.

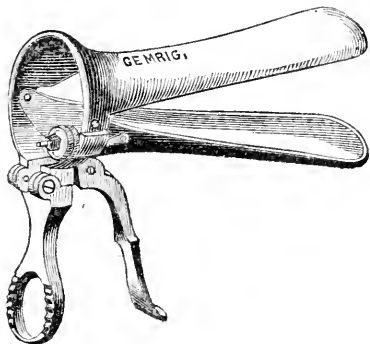
The simplicity of this apparatus, its effect in taking pressure off the acetabulum, and in bringing down the heel, are the grounds upon which it is recommended to the profession for trial.

Fig. 5.



New Form of Vaginal Speculum.—Dr. GETCHELL exhibited a modification of a French instrument called Cusco's speculum. The original is

a short bivalve with flat, wide blades coming together at the ends, and opening by short leaves that fold to the side and end when not in use. The theory of its operation is, that by distending the valves the vagina is taken up, thereby drawing the uterus near the vulva, which facilitates manipulation, and gives a much better view of the os than can be obtained through the cylindrical speculum, which pushes the uterus high up within the pelvis. It is also small, convenient to carry, and, being simple in its construction, not likely to get out of order. We found with the original instrument that



in cases where the vagina was large and much relaxed, the valves when fully expanded failed to distend the vagina sufficiently to give a view of the os. The modification consists in simply lengthening the valves about one inch, which of course allows much greater distension of the vagina. We have used this instrument in quite a large number of cases, and always found it to work satisfactorily.

ART. XIII.—*Summary of the Proceedings of the Pathological Society of Philadelphia.*

1866. Sept. 14. *Fibroid Thickening of Pyloric Half of Stomach, Peritoneal Ulcers, etc.*—Dr. S. W. MITCHELL exhibited the specimens, and read the following report :—

S. G——, æt. 65 years, cabinet-maker. Has had good health, excepting a brief attack of jaundice eight years ago.

About two years back he began to complain of nausea and of intense pain in the left side after eating, followed in a half hour by emesis. These symptoms were readily relieved at first, but returning again and again, were conquered with increasing difficulty.

Last fall I detected a tumour which lay across the belly, at the level of the seventh rib. It could be felt to move with the diaphragm, but could be caught during deep inspiration, and detained within the grasp of the hand; released, it slipped upwards, and sometimes could not then be felt. It altered the percussion note very little. As neither liver nor spleen was enlarged, the position and form of the mass led me to think it might be the pancreas, but fats were as easily digested as other food, and the swelling was rather more conspicuous than are pancreatic tumours in general. Although most of the signs pointed to the stomach, and hinted at cancer, some of the more remarkable of these symptoms, such as vomiting, ceased long before the case ended; and, moreover, the smooth sausage-like form of the mass was unlike that of gastric tumours.

During last winter, and up to death, Sept. 4, 1866, the patient rapidly lost flesh; diarrhœa began in March, and he continued to have three to six loose stools daily. His urine was scanty and high-coloured, but not otherwise peculiar. His appetite decreased during the spring, so that to eat became a daily task; but during the last two months he did not vomit at all. The pain was in the left side two years ago. During the last winter it was referred to the epigastrium, and was constant until death ensued.

In August, while I was absent, Dr. W. W. Keen saw Mr. G., and was unable to discover the tumour. On my return, I was surprised to find the same difficulty. It was due, as we discovered, at the cadaveric section to the scaphoid form of the belly; the absence of wind permitting the anterior abdominal wall to be drawn so tensely across the angle formed by the cartilages of the ribs, as to make it impossible to seize the mass, and even to prevent it from being pushed far down by the act of breathing.

Death from asthenia took place Sept. 4, at 5½ A. M.

Post-mortem.—Section by Dr. W. W. Keen, Sept. 5, at 12 M. Extreme emaciation. On dividing the skin, etc., we could not anywhere see a morsel of fat. No gas in the small intestines, which lay so entirely in the lumbar regions alone, that the division of the teguments brought the aorta into view at once. There was some gas in the colon. The peritoneum, both the free membrane, and that upon the intestines was dotted with ulcers, least frequent and whitest near the peritoneal attachments; red, dark, or black, and most numerous near to the intestines. In the recto-vesical fold was an ulcer covered with clots of blood. Size

two and a half inches long, half inch wide; edges ragged. The other ulcers varied in size as in tint, *i. e.*, from half a line to two lines in diameter. In many points they had healed, leaving a firm, white, central scar. They were present upon the gall-bladder in small numbers. Along the edges of the peritoneal folds, and hanging from the intestines, were watery yellow sacs, of small size, two to eight lines long, looking like the peritoneal pouches, empty of their usual fatty tissues. From the intestines also hung in numerous places what seemed to be projecting enlargements of veins. In some cases these were a line to two lines broad, and looked like hæmorrhoids. Liver, colour healthy; tissue normal; length eight inches, breadth five inches; gall-bladder half full of thin yellow bile. This sac projected an inch over the edge of the liver, a finger-shaped prolongation.

Below the liver, covered entirely by the transverse colon, was the stomach. It was composed of two parts; one, the pyloric, was hard and round, five and three-quarter inches long, and at one inch from pylorus, one inch and a quarter in diameter. It kept this size over four inches of its length from right to left, then grew a little wider, and finally formed a pouch, which was the cardiac end of the organ. It was here two and a half inches wide, and the walls were, as usual, soft and mobile. As they approached the pylorus they thickened, until they left a narrow passage through the length of the firm cylinder of tissue which ended at the duodenum.

There were no ulcers in the mucous coat of the intestines. One large ulcer at the beginning of the thickened part of the stomach, congestion, and even old inflammation all the way down the canal. Spleen and pancreas normal. Entire absence of fat around kidneys, which otherwise were healthy. Lungs adherent at top and upper third of right lung; no tubercle at apex. Lungs dotted on pleura and inside with little hard, white bodies, like small shot. (*See Microscopic Examination.*)

Heart small, and looks œdematous throughout. At the line of union of right auricle and ventricle there was a bulging sac full of gelatinoid fluid surrounded by smaller ones much like it in appearance. The largest was an inch long. Also, from the right auricle down to the apex along the right cardiac border, we found a line of similar bodies. These seemed to me to be pericardial doublings which had once held fat, but now were only half filled by water and loose connective tissue, with a minimum of adipose material.

Simple as this explanation may seem, the appearance presented by these bodies was altogether new to me; but I should add that I never before saw so absolute a loss of all the fatty tissues. There were about two ounces of fluid in the pericardium, a little less in the left pleura, and none in the belly.

One of the most curious points in this case was the finding a small particle of fat and of a small concretion, both lying free in the peritoneal cavity. The stone lay to the right, immediately internal to the external iliac artery. It has externally an organic layer, and within is hard. Dr. Bridges states that it is composed chiefly of phosphate of lime.

The following is the result of the microscopical examination made by Dr. W. W. Keen:—

I. *Stomach.*—The cardiac extremity of the walls of the stomach was somewhat thicker than usual. A section showed the glands considerably enlarged.

The pyloric extremity was about three or four times the normal thick-

ness. A section here gave a large amount of fibrous stroma, arranged in oval and circular meshes. In these meshes were masses of nuclei and cells. The latter were nearly all fragmentary. Their walls were generally indistinct, their forms mostly rounded, or if angular, it was apparently by reciprocal pressure. Some few were nucleolated. The nuclei were mostly oval, rather large, granular, and in some cases nucleolated. They were more numerous than the cells.

II. *Heart*.—The apparently gelatinoid cysts showed (1), some connective tissue, with here and there an elastic fibre; (2), a large number of fat globules, and (3), abundant granular matter and fragments of cells. The connective tissue had no definite arrangement, nor did it contain within it the fatty and granular matters.

III. *Peritoneal Ulcers*.—They showed simply connective tissue with pigment in large quantities, and granular debris.

IV. *Lungs*.—The little, round, hard, shot-like bodies were made up of an outside circular ring of connective tissue with a large deposit of pigment in it. The contents of this ring of connective tissue were hard, gritty, friable, did not effervesce on the addition of hydrochloric, nitric, or acetic acid, nor was it soluble in these acids. Its character was not determined, but it was probably degenerated tubercle.

Sept. 26. Fracture of Cervical Vertebra, with Anterior Dislocation and Compression of Spinal Cord: Death in Twenty-Four Hours.—Dr. WILLIAM PEPPER exhibited the specimen and read the following:—

Mary Nicholson, æt. 19, Irish, a large, heavily-built girl, was admitted to Pennsylvania Hospital at 4 P. M., July 5, 1866. The day previously, at about the same hour, she fell from a small pie-cherry tree, certainly not more than fifteen feet in height, so that in all probability her fall did not exceed ten feet. She fell into a cornfield, but it is uncertain upon what part of her body she alighted. From the time of this fall she has been unable to move either hands or feet.

Upon admission she was perfectly rational, and gave a clear account of her injury. Her voice, however, was feeble, and frequently interrupted. The pulse was small and frequent; respirations were 32 in minute, entirely diaphragmatic. Sensation was entirely lost from a little below the clavicle downwards, though in the subclavicular regions she was conscious of the contact when a pin was pushed deeply into the derm. All power of motion of the extremities and muscles of the trunk was gone. The bladder was paralyzed and much distended, as no urine had been passed since receipt of the injury. No discharge of feces had occurred. The tongue could be protruded at will, and moved in any direction. The expression of the face indicated great respiratory oppression, rather than acute suffering. The pupils were about normal; the cheeks brightly flushed and very hot. The whole surface of the body was of much higher temperature than normal—a thermometer in the left axilla showing 108.5° at instant of death.

The above observations were made quickly, as she gave me the history of her accident; and while she was speaking in a sufficiently clear, though interrupted voice, she abruptly asked to be raised in the bed; her breathing became gulping and imperfect, and in less than two minutes she fell back dead. The pulse continued perceptible at the wrist during the greater part of one minute; and the cardiac sounds were audible for between three and four minutes after the last respiration, becoming gradually slower, weaker,

and more muffled and confused. Death thus occurred 24½ hours after injury.

Post-mortem twenty hours after death.—The brain was not examined. The body was large and very fat. The lungs were deeply congested. The heart contained a large quantity of blood mixed with clots, both dark and whitish firm ones. Abdominal viscera healthy. Intestines contained an immense number of cherry-stones.

Spinal column.—The tissues surrounding the cervical vertebræ posteriorly were ecchymosed, and infiltrated with bloody serum. No blood had escaped anteriorly into pharynx. Upon removing the cervical portion of the column, the fourth vertebra was found to be luxated anteriorly, owing to fracture of one of the articulating processes, so as to encroach considerably upon the spinal canal. In addition to this there was a comminuted fracture of the atlas, the lateral masses being separated and the arches broken in two places. There was not, however, any considerable laceration or compression of the spinal cord at this portion.

A brief review of this case suggests the following points of interest:—

1. The extreme degree of comminution of the atlas, without serious injury of spinal cord at corresponding point.

2. The simultaneous production of fracture, with anterior luxation of the fourth cervical vertebra—the paralytic symptoms being due to the injury of spinal cord at the seat of this lower injury.

3. The congestion of the face and the extreme elevation of the temperature of the surface.

4. The persistence of the cardiac contractions after the cessation of respiration.

5. The sudden death, undoubtedly caused by the movements of the patient displacing some of the fragments of the fractured atlas and producing compression of the upper portion of the spinal cord.

Oct. 24. Fibroid Tumour of Uterus.—Dr. WILLIAM PEPPER exhibited the specimen and read the following:—

The patient was of the higher classes of society, unmarried, aged about 46, of spare habit, but had enjoyed good health until twelve years ago.

The case has been under the care of Dr. Levick, to whose courtesy I owe the opportunity of examining and describing the specimen.

At that time—twelve years ago—she first evinced symptoms of uterine derangement, had excessive hemorrhages, and, upon a vaginal examination being made, the diagnosis was formed of uterine polypus, and an unsuccessful effort made to reach it with a double cannula and ligature. The morbid growth has developed more or less rapidly from that time, producing most serious symptoms. For the first seven years she suffered with profuse hemorrhage, recurring at every menstrual period, at times so exhausting and prolonged as to threaten a fatal result. For the past five years this has moderated, and she menstruated regularly up to age of 43 or 44, when her courses ceased, apparently from natural causes. The most marked symptoms during this time have been difficulty in voiding urine, occasionally requiring the introduction of a catheter; severe pain in the pelvic cavity extending down limbs; œdema of lower extremities, more extensive on right side than on left; constipation, never excessive, being always relieved by mild laxatives; and occasionally dyspnoea and palpitation of heart.

There is a strong scrofulous taint in the family, but the patient has never evinced any tendency to tuberculosis.

About six weeks before her death, which occurred October 21, 1866, she noticed a small hard mass projecting from her vagina—horribly fetid, and discharging a thick sanious offensive matter. This mass increased in size, until it formed a horn-like projection from the vulva, two inches in length and almost an inch in thickness at its extremity.

The abdominal enlargement, which was as great as at the eighth month of pregnancy, underwent no diminution during this time.

Until a few days before her death she was able to move about the house, but then sank somewhat rapidly, and without manifest cause.

Post-mortem twenty-four hours after death.—Body emaciated. Brain and spinal cord not examined.

The lungs were anæmic, but healthy.

The heart was large, flabby, and slightly dilated: distended with dark, soft clots, and dark blood. There was no valvular disease.

The liver was somewhat enlarged and firm from chronic congestion, and presented, on the anterior part of the right lobe, a sulcus four inches long and one-third inch in depth, where the peritoneal investment of the organ was thickened and whitish. The apparent cause of this had been the great upward pressure which the uterine tumour had exerted upon the abdominal viscera, forcing the anterior edge of the congested liver against the edge of the ribs.

The base of the thorax was expanded, the lower ribs being thin, and their cartilages firmly ossified and quite brittle.

The spleen was enlarged to double its normal size: its tissue was firm and reddish.

The kidneys were somewhat flabby, and presented dilatation of their pelves, with some thinning out of their secreting structure.

The small intestines were forced upward under the arch of the diaphragm, and posteriorly into the lumbar regions: their calibre was small, and in places packed with hard scybalous feces, which, during life, had communicated a feeling of bosselation upon palpation.

Before opening the abdomen, it gave the impression of containing a uterus developed to the full term of pregnancy. The tumour could be distinctly traced through the parietes; its outline was ovoidal, its surface smooth and uniformly firm, elastic, and non-fluctuating. The superficial veins of the abdomen were unusually prominent. The part of the mass which projected from the vulva was evidently in an advanced gangrenous state, and extremely offensive.

Upon laying open the abdomen, the tumour was found to be strongly adherent to its anterior parietes, to the iliac fossa, and posteriorly to the tissues along the spine.

The mass—which was evidently the enlarged uterus—rose up out of the pelvic cavity, extending almost to the ensiform cartilage, and displacing the abdominal viscera. The urinary bladder was tightly adherent to the lower part of its anterior surface, and was so drawn upward and bent forward and compressed against the pubis as to greatly constrict its lower portion. A single fold of small intestine was moderately adherent to the fundus of the tumour.

The ovaries were attached to the sides of the enlarged uterus, were of normal size, and marked with cicatrices from the escape of ova, and were

in their normal relation with the Fallopian tubes, which appeared patulous and in every way healthy.

A large coil of distended vessels—branches of the internal iliac trunks—traversed the fundus of the uterus under the peritoneal coat, having entered the broad ligaments. The surface of the uterus also presented a fine network of quite large vessels.

The lower part of the tumour filled the pelvic cavity; more completely, however, on the right side, so as to produce greater pressure upon the vessels and nerves of that side, whilst the rectum was only moderately compressed.

The uterine cavity was laid open by a longitudinal incision through the anterior wall. The disease consisted in an enormous fibroid growth in the anterior wall, which appeared to have originated in the layer of muscular tissue adjoining the mucous membrane, and to have preserved the same relations during its development, so that the entire mass formed an ovoidal tumour in the anterior wall, preserving its mucous lining internally, and distending the external layer of muscular tissue of the anterior wall till it formed a thin capsule. The tumour had then developed downward, and had finally involved the cervix and grown into the vagina, still preserving the same relations to the uterine walls, so that the external layer was still stretched over it, and internally the mucous membrane of the anterior lip could be traced on the right side.

On the left side of the mass, it had advanced further into the vagina, even projecting, as before said, several inches from the vulvæ; and the gangrenous ulceration which was noted during life in the projecting part had extended up to the cervix uteri, destroying part of the mucous membrane lining the cervix, and any adhesions which might have been formed with the left side of the vagina.

On the right side, however, the mass was strongly adherent to the vagina about three-fourths of an inch below the cervix. The posterior wall of the uterus was much hypertrophied, and of distinctly muscular appearance; the cavity of the uterus was necessarily much enlarged.

The posterior lip of the uterus could be readily seen as a ridge separating the enlarged cavity of the cervix from the distended vagina.

The weight of the mass was about 20 pounds.

The measurements of the tumour and other parts of the uterus are subjoined:—

Circumference of uterus laterally	27 $\frac{1}{2}$ inches.
“ “ longitudinally	36 “
Length from fundus to tip of projecting part	16 “
Length of projecting part—from cervix	6 $\frac{1}{2}$ “
Thickness of anterior wall—through mass of tumour	9 $\frac{1}{2}$ “
“ posterior wall near fundus	1 inch.
Length of uterine cavity—from posterior lip to fundus	7 $\frac{3}{4}$ inches.
Width of uterine cavity	5 $\frac{1}{2}$ “
“ venous sinus in body of tumour	$\frac{1}{3}$ inch.

The consistence and colour of the tumour varied; in the upper part it was very dense, hard, and elastic, and of a dull whitish colour, while in the lower part, which had occupied the pelvic cavity, it was much softer and more doughy, and was much discoloured, presenting patches of dark reddish-brown or black. Numerous large vessels, exactly resembling the sinuses of the impregnated uterus, traversed the mass: most of them contained firm, reddish coagula. The microscopic examination strongly favoured the view that it was in great part a homologous rather than a heterologous growth. There was very little fibrous tissue present in any of the numerous

fields examined; but the bulk of the mass was composed of fusiform cells with single elongated nuclei, with numerous granular nucleated corpuscles and some larger nucleated cells interspersed through the tissue, or aggregated in loculi formed by the fusiform cells. These latter cells were wholly undistinguishable from partially developed uterine muscular fibre cells. Examination of the posterior wall of the uterus, which was reddish and evidently had developed into muscular tissue, showed exactly similar cells to those observed in the growth in the anterior wall.

In addition to these elements, there were abundant crystals of hæmatin, especially in the discoloured parts; and throughout the whole mass, numerous fragments of crystalline matter, probably phosphate of lime mixed with the ammoniaco-magnesian phosphate.

The mucous membrane of the cavity of the uterus was smooth in some places, but in others appeared excoriated and discoloured. The external layer of the anterior wall which, as has been said, was stretched over the growth so as to form a capsule, contained a considerable amount of fibrous tissue mixed with a few fusiform muscular fibre cells.

This case of morbid growth of the uterus presents numerous features of interest. The original starting-point of the growth appears to have been in the muscular layer adjoining the mucous membrane of the uterus; and yet its mode of development—retaining the same relations to the tissues—forms a marked exception to the rule, that the nearer the fibroid growth takes its origin to the mucous membrane, the greater is the tendency for it to protrude into the uterine cavity and finally to become pendulous and pediculated. This tumour also presented the peculiarities, so rare in growths of this nature, of being exclusively seated in the anterior wall, of involving the cervix and projecting into the vagina, and finally of having acquired strong adhesions with the vagina.

In regard to the gangrene of the inferior part of the mass, no more plausible suggestion offers itself than that this portion had been strangulated by compression against the bony outlet of the pelvis.

As to the essential nature of this growth, there seems little room for doubt. The clinical history of the case, the slowness of its development, the absence of hereditary predisposition, and the long retention of the general health, argue against the idea of its malignant nature, no less than do the anatomical characters, the regularity of outline, the healthy state of the ovaries and surrounding viscera, and finally the microscopic characters. And it is in accordance with the very positive evidence afforded by microscopic examination, that we are disposed to class this tumour with those alluded to by Vogel and by Jones and Sieveking, but most elaborately described by Bristowe¹—which consist of tissue homologous with the structure of the uterus, and are in fact muscular growths of the walls of that organ.

Sept. 26. Hepatic Abscess following Chronic Dysentery.—Dr. HERBERT read the following history:—

Michael Hagan, born in Ireland, aged 27 years, was admitted into the Pennsylvania Hospital on Monday, July 2, 1866. He was a sailor on a schooner which ascended the Cape Fear River, North Carolina, for a load of shingles, which she brought to Wilmington N. C.; she then started for Philadelphia about the middle of last May. As they were coming up, a storm forced them to lie over at Fortress Monroe for three

¹ Proc. Path. Soc. London, 1853, vol. iv, p. 2.

or four days, when they again started for Delaware Bay, being three or four days coming up. On the night after leaving Fortress Monroe, Michael Hagan slept on deck, without clothes. He awoke next morning with pains all through him, and was in such agony that he rolled from one side of the deck to the other; he suffered pain particularly in the right side, extending from the nipple to below the ribs, also great pain in the back and legs. He was landed at Lewes, at the mouth of the Delaware, whence he immediately came to the city in a steamboat. He remained sick four or five weeks with his friends, and then came to the hospital. When he entered, he was exceedingly pale, the whole surface of the body presenting very much the waxy appearance we notice in the lower extremities in cases of Bright's disease of the kidneys; lips and tongue were almost white; scleroticæ pearly. The expression of the face was very dull and heavy, and his intellect so very dull that we could obtain only the above history little by little, after many queries. There was no emaciation, but the body was round, the muscles soft and flabby. There was no pain, but great lassitude and a feeling of great weakness; no appetite; profuse sweating both night and day, with a cool, sticky skin; a great tendency to sleep both day and night, and very feeble pulse. He was, indeed, exceedingly weak. There was no abnormal tenderness, dulness, or distension of the abdomen; no enlargement of liver or spleen, but complete dulness over right thorax, and total absence of respiratory sounds except at the apex and the root of right lung; left lung was normal. Heart-sounds faint, but without murmur. Passes about normal quantity of urine daily, which is pale, clear, with slight whitish deposit; sp. gr. varying from 1004 to 1008; chlorides abundant; no albumen, and not phosphatic; urine was not examined under microscope. At this time there was no œdema, though he said his legs had been swollen; nor was there any diarrhœa, though he had had a little—could not make out when, but think he said he had dysentery last summer.

He was placed upon the best diet, with twenty-four fluidounces of beef-essence and eight fluidounces of wine-whey daily. Prescribed tinc. ferri chloridi, and, believing there was a malarial complication, the sulphate of quinia was given.

July 4. Continues to lie upon his left side. Respiration is quiet and easy, pulse weak, and no appetite. The hydrothorax continues; sweats profusely; complains of weakness, but not of pain; sleeps well. No apparent change since admission.

6th. The only change apparent is slight emaciation, though he eats well, but without appetite. For last two days bowels have been rather loose, moved about four or five times in twenty-four hours; stools varying in consistence from that of Indian-mush to thick gruel, and are of a blackish or greenish yellow colour, probably due to the iron he is taking. Stools contain no blood, but some mucus.

8th. Emaciation is becoming more and more apparent. Still has the waxy hue of skin, but is not the least jaundiced. No diarrhœa since last note; did not find it necessary to give him anything for his bowels. The condition of chest remains the same; still the extensive dulness and the almost total want of respiration. Is still very weak, and still sweats profusely.

10th. The treatment is to-day changed from the tincture of the chloride of iron to pil. ferri carb. To-day, I think, for the first time, was noticed some swelling of the legs, with pitting upon pressure; also the slightest puffiness of the eyelids. Emaciation progresses, and though he has a little

better colour in his lips, he nevertheless does not gain in strength. Urine does not contain the slightest trace of albumen; sp. gr. still very low.

20th. Upon examining the chest, find there has been no absorption of the fluid in right pleural sac; there is still the same extent of dulness and same absence of respiration. Heart-sounds are but faintly heard, but there is no murmur. Patient says he suffers no pain. Continues to be very dull, to sleep most of the time, and to sweat profusely. Is very much emaciated. Eyelids and feet very œdematous; appetite poorer; bowels were loose yesterday, but not so to-day. Treatment continued.

27th. Treatment to-day changed by giving the liq. ferri peracetatis in addition to the pill containing iron and quinia. Patient is gradually sinking.

30th. Seems a little brighter to-day; except this, can note no change.

Aug. 2, 9 A. M. Find him this morning lying on his left side, with his knees drawn up, suffering great pain in abdomen, which is very painful to the touch or when pressed upon. The pain is almost unbearable when he lies on his back. Ordered a warm flaxseed poultice to be applied over the abdomen, and an enema of twenty drops of laudanum, which in a short time gave him much relief. Was called to him at 8 P. M., and found him dying. Respiration ten per minute; no radial pulse at either wrist; heart's sounds scarcely audible; impulse not perceptible; whole body cold.

He died at 5.30 A. M., August 3.

Post-mortem examination, three hours after death, revealed the following: Body of a pale waxy hue, very white, with a slight tinge of yellow on the face. Greatly emaciated; eyelids and feet somewhat œdematous; well-marked cadaveric rigidity; body cold.

Thorax.—Upon cutting through the tissues, the muscles were found very much blanched. Raising the anterior wall of the chest, the right pleural cavity was filled with a clear greenish serous fluid, the lower and middle lobes of the lung being perfectly collapsed, the lower lobe being firmly bound down to the convexity of the diaphragm; the upper lobe, about four inches long and three inches broad, was the only portion of the whole right lung which was crepitant, and was seen floating in the fluid at the apex of the chest. The left lung was healthy, and bound down posteriorly by a few old bands. There was no fluid in the left pleural cavity. The heart was slightly pushed to the left. The pericardium was distended with about eight to ten fluidounces of serum; eight inches in length, and six in breadth, being the external dimensions of the distended pericardium. The serum was clear, and of a light yellow colour. The heart was rather small, but otherwise apparently healthy.

Abdominal cavity.—The abdomen was somewhat distended, and contained about four quarts of an opaque yellowish fluid filled with flocculi and shreds of soft yellow lymph. The intestines were distended with flatus and feces, and were everywhere glued together and to the peritoneum by soft yellow lymph, showing the occurrence of recent peritoneal inflammation. The intestines externally presented no evidence of perforation, or any marked internal inflammation or congestion, but presented an unhealthy appearance, being of a leaden hue. On the internal surface of the bowel, patches of this leaden-coloured discoloration were seen here and there throughout the entire length of the intestine, from the stomach to the rectum. In the small intestine the solitary glands and Peyer's patches were somewhat elevated and discoloured, the change being more and more marked as the ileo-cæcal valve was approached. The surface of the ileum just above the valve, to the extent of about five inches, presented the shaven

beard appearance, as did also the Peyer's patches. The valve and the cæcum presented the shaven beard appearance, and the valve was very much thickened. The colon was very much thickened, every part of the intestinal wall being apparently thickened. The mucous membrane was very much softened, covered with thick mucus, and presented throughout the whole length of the colon numerous small rounded elevations having a slightly depressed centre, some injected and others pale; each elevation being about one-fourth of an inch in diameter, and appearing to be the cicatrices of old ulcers. These were rather more numerous and of more recent formation near the rectum and in the sigmoid flexure, where a few small chronic unhealed ulcers were seen. The intestines contained a considerable quantity of yellow liquid feces, containing some small portions of firmer consistence, which adhered to the sides of the intestine. The stomach was healthy.

The *liver* was almost concealed from view by the diaphragm, which was closely adherent to its whole diaphragmatic surface. The adhesions between the liver and the diaphragm were of recent origin, but somewhat firmer than those between the convolutions of the intestines. The superior surface presented externally a large abscess, looking like a fungus, from the fact of its being made up of numerous small abscesses communicating with each other. This abscess was covered by the diaphragm, and extended about eight inches from right to left, and five inches from front to back. The healthy portions of the liver were slightly yellow, and looked fatty. The unhealthy portions were of a dark bluish-brown colour, bulging, and dotted here and there with small yellow elevations, each about the size of a marble, which, when punctured, were found to be filled with apparently true laudable pus. The under surface was much more healthy in appearance. There was one yellow prominence containing pus upon the lobus quadratus, near the gall-bladder. The gall-bladder contained no gall-stones, but was full of healthy-looking bile. The liver was considerably larger than natural. Upon making a transverse incision three inches deep into the body of the organ where the abscess presented externally, the abscess was found to be made up of numerous small abscesses communicating with each other, the largest thus opened being about the size of a hen's egg. Each of the abscesses was filled with apparently healthy pus.

The *spleen* was about the normal size, but was shrivelled, and looked like a contracted spleen. Internally it was very firm, and of a light arterial red colour.

The *kidneys* were of normal size and appearance externally, but internally were very firm and pale, and felt like cartilage. They looked like amyloid kidneys in places, though they were not.

The *bladder* contained but little urine.

Microscopical appearances.—The blood was examined on the 28th of July, and the red corpuscles were found diminished in number, shrivelled somewhat, and some of them granular. The white corpuscles were perhaps slightly increased in number. There were no pigment granules. Contents of hepatic abscess, under the microscope, were seen to consist of granular matter, granular corpuscles without nuclei, and true pus-corpuscles, in abundance.

Liver-tissue.—Cells contained more than normal amount of fat, but preserved their nuclei.

The portion of the intestine which presented the shaven beard appearance contained grains of black pigment deposited in fine points in the mucous membrane.

Oct. 10. Two Cases of Rupture of the Bladder.—Dr. H. WILLIAMS presented the specimens and made the following remarks:—

James Benton, æt. 26, a native of Ireland, and very intemperate, fell, while intoxicated, from the mineral water wagon he was driving, and was run over. When brought to the Pennsylvania Hospital, half an hour later, he was in a condition of stupor, partly alcoholic, and in part from primary shock. The pulse was rapid, thready, and compressible, with a moist, pallid skin. The hips, thighs, and lower part of the abdomen showed signs of contusion, and were said to be the points over which the wheels passed. Considerable gastric irritation succeeded the stupor, with much cramp, colicky pain, and tympanitic distension of the abdomen. Several times, with difficulty, he passed small quantities of urine, always mingled with blood; the latter more or less deeply tinging it. He lived 34 hours after the injury in great constitutional depression, and died with little change of symptoms, save that the abdomen became more tense.

Post-mortem six hours after death.—Abdomen alone opened, which contained a full quart of mingled blood and urine; the pelvis was packed with clots of blood; there was a linear opening $1\frac{1}{2}$ inch in length in the left posterior-vertical aspect of the bladder, the edges of which presented the appearance of having been separated by a disruptive force.

Mary McKees, æt. 53, a native of Ireland, was run over on the eve of Oct. 3d, 1866, by a wagon. On admission to the Pennsylvania Hospital within an hour after, she presented the following symptoms: A pulse of 130, characterized by great feebleness, respirations 28 in the minute, with a quite frequent tendency to yawn; the skin cool and damp, with marked pallor of general surface, while over the mons veneris there were marks of severe contusion, over which point the wheels were said to have passed. The crepitus of broken bone was easily obtained by grasping the iliac crests, and making movements from those points. Several hours later she was unable to void her water, and the catheter being introduced, about two ounces were drawn off so mingled with blood as to greatly interfere with its passage through the instrument. The patient complained greatly of cold, and external warmth, with diffusible stimuli, was employed, and the dorsal decubitus enjoined. The patient lived a little over 48 hours, with some reaction from her first depression, and was even cheerful; but the extreme pallor continued, and there was much tympanitic distension of the abdomen, with great tenderness over the lower part. An aperient produced a free evacuation of the bowels. The catheter, introduced twice in the 24 hours, never drew off more than $2\frac{1}{2}$ oz. of urine, in which the admixture of blood became less and less, latterly only amounting to a tinge. She continued in great depression until death took place, on the eve of October 5th.

Post-mortem twelve hours after death.—Abdomen alone opened, which contained a pint and a half of mingled blood and urine. There were traces of old peritonitis in well-organized, firm adhesions, binding the omentum and some convolutions of the ileum together. Beneath the peritoneum, lining the pelvis, there was much extravasated blood mingled with urine. The left pubic portion of the os innominatum had sustained a much comminuted fracture, and a sharp fragment had inflicted a penetrating wound of the bladder, to the left of its mesial line, and about $1\frac{1}{4}$ inch below the point where the peritoneum is reflected from the fundus to the anterior wall of the abdomen. The bladder was collapsed and empty, save a few clots of blood.

REVIEWS.

ART. XIV.—*Clinical Lectures and Reports by the Medical and Surgical Staff of the London Hospital, with an Appendix on the Recent Epidemic of Cholera.* Vol. III. 8vo. pp. 499. London, 1866.

CLINICAL instruction has of late years been made a very prominent part of medical education, and very properly so ; but its usefulness has been impaired often by abuses which have crept in, some of which are the necessary result of the very mode of education which is generally pursued in our profession. It will be profitable, therefore, as introductory to our notice of the book under review, to consider the proper place and function of clinical teaching in medical education.

It should not be entered upon at the outset of the course of study. There needs to be some degree of preparation on the part of the student to enable him to profit by it. The present custom is to have the fresh students attend with the advanced upon clinical lectures. The actual instruction imparted to the former is much less than that which comes within the grasp of the latter. It is so little, indeed, that it may be truly said that they had better occupy their time in some other way. But it is not a mere loss of time that is the chief objection to the plan. It is the injury that it inflicts upon the mental habits of the student. It tends to make him a poor observer and a loose thinker. He hears so much that he cannot understand, that he insensibly forms the habit of taking but little of what he hears fairly into his mind, and of holding that little very loosely. It may be in the case of a few who have uncommonly active minds, and who have been trained in strict habits of thought and observation, that what is actually understood is culled out carefully from what is not, and is garnered up in the memory. But there is no such sifting process in the minds of the great mass of students of medicine ; and, therefore, the subjecting them to attendance on lectures which are for the most part beyond their comprehension, confuses their ideas, and materially impairs their mental vigor and clearness.

There is another point of importance. The profit which a student gets from instruction depends upon the interest which it awakens in his mind, and this again depends chiefly upon the degree to which he understands what he hears. If then the great majority of what he hears is beyond his comprehension, how much must his interest be dampened, and how injurious is it to have this effect produced upon him at the very outset of his education.

There is another point still. So shadowy and confused are the glimpses of truth which the fresh medical student gets in the clinical lecture, that some errors will inevitably be lodged in the mind, which may or may not be got rid of in future instructions. And errors are certainly most of all to be deprecated in the practical part of our teaching.

This misplacement of clinical instruction is only one phase of a general fault that exists very glaringly in the prevalent symptom of medical edu-

cation. The fault is a radical one. The want of due sequence and gradation in studies is the grand cause of failure, and the looseness of thought and observation thus engendered stamps its character upon medical practice, and of course upon medical literature. We would like to dwell at large upon this point, but this is not the place for it.

A word on the style of clinical lecturing. It sometimes is not really clinical, but is like the general lecture, the only thing clinical about it being an occasional and perhaps slight reference to the patient. Like the text of some sermons, he is almost lost sight of, and a full lecture is given not only upon the malady from which he is suffering, but upon other kindred maladies also. The clinical lecture should be especially upon the points presented by the cases, particularly in regard to diagnosis, and the aims of medication; and full descriptions of the diseases should be deemed out of place. No one should ever have occasion to say of a clinical lecture on a patient, as we have sometimes heard it said, that for all practical purposes the patient might as well have been out of sight.

It should be made quite an object to exhibit to the students the modes of investigation which should be pursued in making out a diagnosis in different cases. We refer both to the direct examination of symptoms, and the sifting process, which more or less has to be applied to the statements of patients in regard to their own cases. The unravelling of a case is often the very highest instruction that can be given, and it is what cannot be imparted in a general lecture on disease.

No lecture has more of the essentials of interest than a clinical lecture. Whatever is practical is always interesting. Then, besides, there is the actual presence of the thing talked about. And there is added also, we think we may say very commonly, the interest of sympathy with the diseased and suffering. Now, there are some that seek to add to all this a sort of theatrical charm, degrading the clinical lecture to an occasion for self-display and the mere idle gratification of the audience. And sometimes, we regret to say, that in doing this delicacy and propriety are outraged.

Hospitals present fine opportunities for furnishing to the profession extensive reports of classes of cases. There is an advantage here over private practice in many respects—in the number of cases of any one disease, in the facilities for making minute records, and in the entire control of all the circumstances of the patients. At the same time it is to be remembered that hospital practice and private practice must necessarily be often different from each other. In acute diseases in hospital practice there are more often cases brought under treatment that are at an advanced stage, or that perhaps have been already treated, and in what way it is either known but partially or not at all; and in chronic diseases the patients have very commonly gone through a considerable experience of suffering, and of treatment, medical, or quackish, or both, before they come to the hospital. To say nothing of other differences, there is more call for stimulants and tonics in hospital than in private practice. Full reports of both, so that the requisite comparisons may be made, would be exceedingly valuable. We have not enough of such minute records. Conclusions, inferences, summings up of results we have in great abundance. But these take too much the colouring of the opinions of the individual, which very often may be found to be somewhat inconsistent with the facts, if they are recorded with any degree of faithfulness and minuteness. The great need of the profession in therapeutics is full records of cases, giving in each disease the mild

and the severe alike, and also those in which the treatment is unsuccessful as well as those in which it is successful. On this latter point there is often a glaring defect. The account which Graves gives of the use of tartarized antimony and opium in certain conditions of typhus fever, valuable and significant as it is, is much marred in this respect. He reports quite circumstantially all the cases in which the treatment resulted in recovery, but while he refers to cases in which it was not successful, he does not give us the details of one of them. These might have thrown some light upon the proper limitations of the practice, and cleared up some points that need to be cleared up. We would not be understood as throwing any doubt upon the real value of the contribution that he has thus made to our therapeutics, for we have witnessed ourselves in the most marked manner the success of the practice; but the omission referred to has prevented him from giving to us its full value.

Reports of cases may be full, and yet may be very poor reports. A minute observer may not after all be a good one. He may make altogether too much of some facts and too little of others, and this fault will be seen in his description of cases. In the midst of his minuteness he may even overlook some circumstances that are of prime importance. In a good and correct account of a case all the facts are brought out in their due proportion. To do this, there is required, first, skill in observation, and second, skill in representation, the first being a *sine quâ non*.

Sometimes we find strange omissions on the part of those who may be called good observers. This is commonly owing to the influence of some opinions that bias the mind in its observation. One of the most striking examples of this omission we have in Louis' two volumes of cases of fever. Here, with extraordinary minuteness of observation on most points, the record of the number and the character of the alvine discharges is exceedingly meagre. And yet observation should certainly have been decidedly directed to that quarter, in connection with the lesion which was found so uniformly in the intestines.

It is minute, judicious, and comprehensive observation that is to do the great work in diagnosis and therapeutics. To this has our profession very much come at last, after ages of blundering about among dazzling theories. The time has gone by for the framer of an ingenious general theory of medicine to bear rule. It was because this reign of rigid observation was setting in that Broussais, the last of the long succession of theorizers, unlike his predecessors, lived to see his theory die out, though at the first he had multitudes of adherents. The question now is not so much what one thinks, but what does he know—what has he found out—what has he proved. Suppositions, indeed, on particular points are indulged, as pioneers in getting at the facts; but these are very different from those compounds of facts and suppositions which have been termed theories in medicine in the ages that are past.

In this work of observation our hospitals are to bear a prominent part, from their facilities for making it thorough, exact, and comprehensive. We are glad, therefore, to see that some of them are publishing annual reports of their observations and clinical lectures. The volume before us is a collection of this character for the year 1866.

With these preliminary observations we propose to notice some of the contents of the volume.

One of the most interesting papers in the volume is on Spectrum Analysis, by Dr. LETHEBY, the Professor of Chemistry at the London No. CVI.—APRIL 1867. 29

Hospital College. What is said of the physiological and medical uses of this means of investigation is preceded by a historical account of the successive discoveries that have led to the rich facts which are at length developed. A brief summary of these will not be uninteresting to the readers of this Journal.

The discovery of the solar spectrum was made by Sir Isaac Newton, in 1701. His experiments were repeated for a whole century without adding anything in the way of discovery. But in 1802, Wollaston, by using a narrow slit instead of a circular aperture for the admission of the sun's rays, produced a far more perfect spectrum, and dark bands, not before seen, now intersected the colours. He also examined the spectra of different kinds of light, as the flame of a candle, and electric light, and he noticed that the spectra differed much from each other. And here was in reality the starting-point of spectrum analysis. But how much significance there was in these dark bands or lines, and in the differences of the various spectra, was utterly unknown to Wollaston, and was to be discovered only by multifarious and long-continued investigations. Indeed, the researches of a half century have probably fallen very far short of developing all of it.

In 1815, Fraunhofer, a German optician, fixed the prism before the object-glass of a telescope, and the spectrum being thus magnified showed the dark lines seen by Wollaston so distinctly, that he recognized and marked the relative position of over six hundred of them, distinguishing the most important by capital letters, and the least important by small ones. He knew that these lines must mean something, and though he did not himself divine their meaning, he with true scientific zeal did the work, and placed the results on record—results which have since proved to be of great value, being constantly referred to in investigations at the present time.

In 1822, Sir David Brewster examined the spectra of flames coloured with various salts, such as are seen displayed in pyrotechnic chemistry. Sir John Herschel, in the same year, pursued the same line of investigation. He stated as the result, *that the colours communicated by the different bases to flame afford, in many cases, a ready and neat way of detecting extremely minute quantities of them, and that the tint arose from the molecules of the saline matter reduced to vapour, and held in a state of violent ignition.*

A year or two later, Mr. Fox Talbot pursued the investigation still farther, developing new facts which illustrated beautifully the truth above stated.

In 1835, Mr. Wheatstone gave an account of the spectra produced by the prismatic decomposition of the electric, voltaic, and electro-magnetic sparks, and also of the different spectra when the sparks were taken from different metals; and after many observations, he states that the appearances are so characteristic, that by this mode of examination the metals may be readily distinguished from each other. He also discovered that the results were not produced by combustion, for the appearances were the same when the sparks were taken in the vacuum of an air-pump and in carbonic acid gas.

From this time there were many observers working in this field, bringing out many valuable facts, and approaching very nearly to conclusions which, by patient and varied investigation, were reached many years afterwards. For example, Dr. W. A. Miller, of Cambridge, England, said, in 1845, as a result of his observations, "It would therefore appear that luminous atmospheres exist in which not only certain rays are wanting, but which

exercise a positive absorptive influence on other light"—a very strong foreshadowing of an important discovery announced by Kirchhoff, in 1859, which we shall notice soon.

The delicacy of the test which spectral analysis offers is wonderful. Swan found, for example, that he could detect the presence of the $\frac{1}{25000000}$ th of a grain of sodium by its characteristic yellow line; in fact, the reaction of this metal is so delicate, and the presence of common salt in air and water is so universal, that it is very difficult to get a flame free from the sodium line. Bunson and Kirchhoff deflagrated different substances in a room, noting the prismatic effects. Calculating from the area of the room and the quantity of matter diffused, they estimated that it was possible to recognize the $\frac{1}{60000}$ th of a grain of potassa or baryta, the $\frac{1}{1000000}$ th of a grain of lime or strontia, the $\frac{1}{60000000}$ th of a grain of lithia, and the $\frac{1}{1800000000}$ th of a grain of soda. And the presence of these different substances can be discovered in the spectra even when they are mingled together, for as they are volatilized at different temperatures, the several spectra follow each other in the order of their volatility.

"Other examples," says the lecturer, "of the delicacy of the test may be given, to show how certainly and easily the minutest portion of these alkaline metals may be discovered. If a little of the ash of a cigar is put upon a platinum wire, moistened with muriatic acid, and then heated in the flame, it shows the characteristic lines of sodium, potassium, lithium, and calcium; and the residue of a single drop of sea-water, treated in the same manner, exhibits the spectra of sodium and calcium. A drop also of the mother-liquor of almost any mineral spring, will show the coloured lines of nearly all the alkalies and alkaline earths.

"It is, therefore, easy to understand how, by this method of research, traces of substances have been found, where they were not suspected to exist, and where, but for this process, they might have remained forever undiscovered. The alkali lithia, for example, once thought to be so rare, is now known to be widely distributed. It has been recognized in a large number of mineral waters, in the ashes of tobacco, in vine leaves, grapes, the tartar of wine, the potashes of commerce, and, indeed, in the ashes of all plants which grow upon certain granitic soils. It has also been found in the milk of animals feeding upon those pastures, in human blood, and in muscular tissue. Strontia also, instead of being a comparatively scarce substance, exists nearly everywhere in the mineral kingdom: it is present in sea-water, in the incrustations upon the boilers of sea-going vessels, in chalk, in certain marbles, and in a great variety of limestones. The new metal, thallium, has likewise been found in many pyritic minerals, associated with copper and iron; and it has been recognized in the ashes of the grape, tobacco, and chicory; and in treacle and wine. The extent to which these researches may be applied in gaining information of the mineral constituents of animal and vegetable tissues is almost unlimited; and the influence of them on the future of physiology is hardly to be conceived."

By this minute mode of analysis several new metals have been discovered. On this point Dr. Letheby says:—

"I may mention that while Bunsen was in this way examining the residue of a mineral spring at Dürkheim, he observed the appearance of certain blue and red bands in the spectrum, which were not common to any known substance, and by pursuing the inquiry, he discovered two new metals of the alkaline series which he named *Cæsium* and *Rubidium*. The former was so named, because of its producing two characteristic blue lines of a sky colour (*Cæsius*), and the latter from *Rubidus*, dark red, in consequence of its showing two red lines at the very edge of the red end of the spectrum. The quantity of these metals in the Dürkheim water was not more than about three grains per ton of water. In like manner *Thallium* was discovered by Mr. Crookes, in March, 1861, in the seleniferous deposit from the sulphuric acid manufactory at Tilkerode, in the

Uartz Mountains : and it was so named from *Thallus*, a budding twig, on account of the beautiful green line which distinguishes its spectrum. *Indium* also, a fourth new metal, was discovered in 1863, by MM. Reich and Richter, of Freiberg, in a Saxony zinc-blende, and was thus named because of the two splendid indigo-blue lines which characterize its spectrum. The first of these metals, Thallium, is of the nature of lead, and gives a bright green tint to a colourless flame : while the second, Indium, is closely related to zinc, and gives a rich violet-blue colour to flame."

Of all the spectra those of the alkalis and alkaline earths are the most characteristic, and they are the most easily obtained. In regard to the metals, the proper way to develop their spectra is to convert them into volatile salts, and of all salts the chlorides are the best.

Mr. Reynolds has contrived a simple but ingenious plan by which nearly all minerals can be made to show the spectra of their constituents. He uses the double blowpipe jet of Mr. Herapath, and by supplying it with hydrogen, and blowing steam charged with muriatic acid through the inner jet, he decomposes the fragment of mineral held in the flame, producing chlorides, which give their characteristic spectra. The spectra of the less volatile metals are best observed by letting the electric spark between fine wires of them. The peculiar tint of the metal is displayed in the spark by the volatilization of a minute quantity of it by the heat and the disruptive force of the electricity.

Non-metallic substances, as well as metallic, have been subjected to spectral analysis. In all cases the character of the spectrum is influenced by the degree of heat applied, becoming both more brilliant and more complex as the heat is increased. In fact, a solid or liquid, so long as the heat is not sufficient to make it otherwise, though it may produce luminosity, will give only a continuous spectrum, having simply the tints of the rainbow ; and it is only when the gaseous flame or electric spark changes the substance into an incandescent, gaseous, or vaporous matter, that the characteristic non-continuous spectrum is produced.

We have already alluded to the discovery of Kirchhoff, foreshadowed by Dr. Miller. Others approached even nearer to it than he did, as Foucault and Angstrom. The discovery, which was not made till 1859, was this— that the rays which a substance emits are the very rays which it absorbs. For example, sodium, when ignited, emits an intensely brilliant yellow light, which makes in the spectrum two closely contiguous bands of yellow ; but if through the flame of sodium, the more powerful beams of the electric or oxyhydrogen light are transmitted, black lines appear in place of the yellow sodium lines, showing absorption. Kirchhoff also ascertained that certain of the bright bands in the spectra of potassium, lithium, barium, and strontium, may, in like manner, be reversed.

On this Dr. Letheby remarks :—

"The explanation of this is very simple, and it applies to the corresponding phenomena of radiant heat, as well as to those of actinic or chemical action. 'Atoms,' says Professor Tyndall, 'which swing at a certain rate, intercept waves which swing at the same rate. The atoms which vibrate red light, will stop red light ; the atoms that vibrate yellow, will stop yellow ; those that vibrate green, will stop green, and so on. Absorption is a transference of motion from the ether to the molecules immersed in it, and the absorption of any atom is exerted chiefly upon those which arrive in periods coinciding with its own rate of oscillation.'¹ This is true of every variety of vibration, and in the case before us the vapour of a metal put in the tract of a beam of light, will

¹ Heat considered as a Mode of Motion, p. 468.

stop its own peculiar vibrations, and, therefore, will produce dark bands in those very places in the spectrum where its own characteristic coloured bands would have appeared. Or if the bands are obtained from the incandescent vapour of a metal, and the light thereof is made to pass through a similar vapour, the course of the light is stopped, and there are no bands at all. The reason, therefore, why incandescent solids and liquids exhibit a white light, and produce a continuous spectrum, consisting of all the prismatic colours, is that their atoms or molecules swing in every variety of vibration from the red to the violet; whereas the vapour of an element swings only in certain vibrations, and thus produces a coloured flame which gives only the few bands of the spectrum which are characteristic of that flame."

And now we come to some most wonderful results of these discoveries. In regard to them Dr. Lethely says:—

"The application of these facts to the interpretation of the luminous phenomena of the universe, and more especially to the analysis of celestial objects, is most interesting; for as the results are not influenced by distance, it follows that whenever there is light enough from any planetary body to produce a spectrum, it affords the means of ascertaining its nature, and of determining its condition. If, for example, it is found that the light emitted by any star or far-off luminous object gives a spectrum with the characteristic bands of ignited terrestrial matter, it is proof that such matter exists therein; and if the spectrum is continuous, it is manifest that the light comes from an incandescent solid or liquid; whereas if the spectrum is not continuous, but consists of only a few bands of colour, it shows that the light is emitted by matter in a state of gas or vapour. And if, in addition to the continuous spectrum, there are dark lines in it, it proves that there is a central mass of ignited solid or liquid matter, with an atmosphere or envelope of vapour through which the light passes, and by which certain rays are absorbed or darkened. This is the interpretation of the dark lines of Fraunhofer in the solar spectrum, which have been for so long a time the puzzle to philosophers. According to the hypothesis of Kirchhoff, the sun consists of a central orb of molten or solid matter intensely heated, and as this emits rays of all kinds of refrangibility, it would give a continuous spectrum, without a break or bar in it, were it not that it is surrounded by a vaporous envelope through which the rays must pass; and in so doing they are partly absorbed; for each element of the gaseous envelope strikes down the very rays which it does itself emit, and thus produces its own black lines. If we could see the spectrum of the envelope alone, without the luminous orb behind it, we should see the very bands, which are now dark, lighted up with their characteristic tints. It would be, in fact, the complex spectrum of all the elementary gases and vapours existing in it. Examined, therefore, from this point of view, we have in the black lines, the dark or reversed spectrum of every element in the solar atmosphere; and we have but to compare them with the spectra of terrestrial vaporous matter to determine their nature. In this way the labours of Kirchhoff and Bunsen have been directed to the spectral analysis of the sun. The position of every line has been compared with the spectral lines of terrestrial matter; and although much has been done in determining the chief constituents of the solar atmosphere, yet as each line must be accurately compared in every particular, it will take many years before the whole of them can be properly studied. Already about 2000 of them have been thus mapped out; and they indicate the presence in the sun's atmosphere of sodium, calcium, barium, and magnesium; with iron, nickel, cobalt, chromium, copper, and zinc. There may also be potassium and strontium; but there are no traces of lithium, cesium, rubidium, aluminium, arsenicum, mercury, silver, gold, cadmium, tin, lead, silicium, or antimony."

This celestial chemistry has been earnestly studied by many observers, Kirchhoff and Bunsen in Germany, Donati in Italy, Miller and Huggins in England, and Cooke in this country, and the results thus far are of the most interesting character. The moon is proved by the spectrum which it gives to have no atmosphere, while Venus, Mars, Jupiter, and Saturn show

that they have an atmosphere, by certain dark lines upon their spectra. About fifty of the fixed stars have been examined, and as their spectra are very nearly the same as the solar spectrum, it is inferred that they are centres of light—self-luminous, and of the same structure as our sun. The nebulae have been examined, and while the results obtained coincide with the observations made with the telescope, in eight instances where the telescope has not been able to discover distinct points, it has been concluded from their spectra that they will never be resolved into groups of stars, but are only masses of luminous gas.

In May last a new star was discovered in the constellation of the Northern Crown, which, examined by Dr. Miller and Mr. Huggins with the prism, revealed some singular phenomena. There were three spectra—one like that of the sun, another with dark lines, and over this a third, with very bright lines. It was concluded, therefore, that this star was like the sun and the fixed stars, an orb of incandescent matter, with an atmosphere of cooler vapours, and that it also had another atmosphere which was still more luminous. And as there had been a sudden outburst of brilliancy in the star, it is inferred that some great convulsion took place which evolved large quantities of gas, and that it is the burning of hydrogen in its combination with some other element, that produces the bright lines in the spectrum; also, that this combustion has heated to vivid incandescence the solid matter. Then, as the hydrogen becomes exhausted, all the phenomena become less intense, and the star rapidly wanes.

We pass over some very interesting statements in regard to the spectra of the rays of heat, and the actinic or chemical rays, and come to what most interests us as medical men.

This spectrum analysis is capable of very broad application. It has been extended into physiological researches, and used as supplementary to investigation by the microscope, confirming its results, or even settling questions where the microscope fails.

The notice of its use in these investigations is thus introduced by Dr. Lethely:—

“That, however, which is especially interesting to us is the application of chromatic spectrum analysis to the recognition of organic and other colouring-matters, and to the discovery of their chemical and physiological nature. The blood, for example, when examined for its spectrum under the action of different reagents, shows that the colouring-matter is principally concerned in the phenomena of respiration; and the appearances of the spectra are so remarkable, that they become the means of discovering the presence of blood in very minute quantity. Professor Hoppe was the first to notice this; and he became acquainted with it by passing a ray of light through a weak solution of blood, and examining it with a prism: he then observed that the blue end of the spectrum was cut off, and that two dark bands appeared in the green. The same effect was produced with the red blood of all animals, and he, therefore, proposed to use it as a means of medicolegal research. Later still, in 1864, Professor Stokes continued the inquiry; and he ascertained that the colouring-matter of the blood, when fresh, was very different from the hæmatin of Lecanu: for it was soluble in water, and had the power of absorbing oxygen, and giving it out with great facility, and that the spectra in the two states of oxidation were very different. He, therefore, named the substance *erythrin*, distinguishing the bright red arterial or oxidized erythrin by the name of *sord. erythrin*, and the purple or venous deoxidized erythrin by the name of *poor erythrin*.”

¹ Virchow's Archiv., vol. xxiii. p. 443 (1882).

² Proceedings of the Royal Society, vol. xiii. p. 357.

The important distinction between the hæmatin of Lecanu, and the cruorin of Stokes, appears very decidedly in the comparison of the spectra. Hæmatin is cruorin chemically changed, either quickly by the application of certain acids, the acetic, citric, or tartaric, or gradually by atmospheric action, probably of an acid character. Cruorin exists in two states, as *scarlet or oxidized cruorin*, and *purple or reduced cruorin*, and the spectra of the two are different from each other. The same is true also of hæmatin.

Long before these investigations of Stokes, grave doubts were entertained of the identity of hæmatin with the colouring matter of the blood, as it appears in the red corpuscles. Lehmann expressed himself very strongly on this point, saying that it was by no means certain whether it is a product of metamorphosis of the true colouring matter of the blood, or whether the hæmatin obtained bears the same sort of relation to that in the blood-corpuscles as coagulated albumen bears to that principle in its fluid state. But it now appears that it is a real metamorphosis, a chemical change that produces it from the cruorin of Stokes.

Cruorin very greedily absorbs oxygen, and also very readily parts with it under the action of reducing agents. The oxygen is, therefore, as it unites with it in respiration, not chemically combined with it, or at least has some kind of loose union with it, "something" as Dr. Letheby says, "like that which fixes gases in water, or which holds the second molecule of carbonic acid in bicarbonate of soda, all of which are easily displaced."

There are both scarlet and purple cruorin in venous blood, the latter being even in comparatively small proportion. This has an obvious relation to the fact that both oxygen and carbonic acid are contained alike in arterial and venous blood, the proportions being different in the two cases, the oxygen being to the carbonic acid as six to sixteen in arterial blood, but as four to sixteen in venous.

The delicacy of the spectrum analysis in the detection of the presence of blood is very remarkable. The $\frac{1}{1000}$ th of a grain of liquid blood may readily be made to exhibit all the characteristic spectra. As an example of the delicacy of the tests, Dr. Letheby states that in the year 1849 he had occasion to make a medico-legal investigation of some blood-stains on linen, and the specimens which have been kept to this time (seventeen years) have been recently examined both by Mr. Sorby and himself with the production of the characteristic spectra with perfect distinctness.

That spectrum analysis will hereafter be of decided service in pathological investigations we have much reason to expect. We close this notice of Dr. Letheby's valuable paper by quoting a paragraph on this point.

"As to the change which the colouring-matter of blood undergoes, when it passes from cruorin to hæmatin, we have but little knowledge, except that it occurs spontaneously, and under the influence of very slight causes. How far this may be concerned in the development of pathological phenomena is hardly to be surmised. The different appearances of the blood, in certain diseases, not only when it flows fresh from the vein, but also when it is seen in the dead body, may, perhaps, be due to abnormal differences in the proportions of scarlet and purple cruorin, or even to the presence of their altered products—hæmatin. Already the observations of Engel and Rokitansky have discovered a more than possible connection between the colour and consistence of the blood in the dead body, and its tendency to soak or diffuse into the tissues, and accumulate in certain organs, and they have even classified these physical properties of the blood into six kinds—each characteristic of a special group of diseases. And if to these observations, which are purely pathological and anatomical, there are added the exact investigations of the chemist, and the careful results of a

searching spectrum analysis, we may hope for a rich accession of scientific facts."

In a paper on diabetes there are six cases reported, three of which ended fatally, and the other three were discharged at their own request, there being some improvement, but no evidence, however, of a real cure. The treatment was, as usual in this disease, very unsatisfactory, and nothing new appears in the article as to the pathology of the disease, though a summary is given of the opinions that have been broached in regard to it.

In a paper by Mr. Hutchinson, surgeon to the hospital, and also surgeon to a hospital for skin diseases, there are details of five cases of unilateral herpes, or herpes zoster, and a tabular account of twenty-seven cases. He starts an interesting inquiry in regard to the nature of the disease thus:—

"Is herpes zoster an *exanthem* or a *neurosis*? If an exanthem, why, then, is it not symmetrical, not attended by constitutional disturbance, not liable to spread by contagion? If a neurosis, why should it not relapse, why should it have stages, and how can it protect the individual against a second attack? There is no other neurosis which can be mentioned (neuridgia, for instance), which is not very liable to relapse, or to return again after cure. My own suspicion is that it belongs to neither of these classes, but that it constitutes a new group by itself, and further, I feel convinced that whoever may succeed in unravelling the mystery which at present surrounds it, must, at the same time, make a discovery in physiology."

He then proceeds to state and comment upon the following propositions.

Herpes zoster may occur at almost any age, and if we except early infancy, is equally frequent at all periods of life.

The two sexes are equally liable to its attacks.

It is not possible to denote any special condition of general health which predisposes to its attacks.

It is not contagious.

As a general rule it does not occur twice in the same individual.

The eruptions (with the very rarest exceptions) are never symmetrical.

It occurs with equal frequency on the two sides.

It generally observes closely the recognized anatomical distribution of some nerve.

The nerve affected is normally a cutaneous one, but this is not invariably or exclusively the fact.

The disease runs a definite course.

In regard to the frequency with which it occurs on the one side or the other we have heard it often asserted that it almost always occurs on the right, and this is certainly true of all the cases that we have seen of the disease on the trunk of the body. On this point Mr. Hutchinson says:—

"An interesting instance of the fallacy of individual opinions when formed without careful statistical inquiry, may be mentioned in the fact, that Reil says that herpes 'always occurs on the *left* side,' and Brett, that 'in nineteen cases out of twenty it is on the *right*.' The two asserters are almost equally in error.

"Sir Thomas Watson, in fifteen cases, found it on the right in ten, and the left in five. Rayer, in fifty-three cases, right, thirty-seven, left, sixteen. Mehlis, of twenty-five cases, right, nine, left, sixteen. The total of these observers gives ninety-three cases, and fifty-six on right side to thirty-seven on the left. In my own experience, I have in sixty-two cases, seen it on the right in thirty-two, and on the left in thirty. We may, therefore, conclude that it manifests no very appreciable preference for one side over the other."

We hardly subscribe to the opinion of Mr. Hutchinson, that "shingles is not a disease of the skin in any correct sense, and that the so-called derma-

tologists have no claim to it whatever." We allow that nervous influence is indeed more decided and obvious in this than in other cutaneous diseases, but it is not enough so to take it out of their company. Herpes zoster is a cutaneous disease, perhaps we may say an exanthem, but one of a very peculiar character. In some respects it stands alone by itself, just as whooping-cough does among the paroxysmal neurotic diseases. We apprehend that nervous influence has more play in cutaneous diseases than it commonly has credit for. Why do boils appear in one part of the skin after another? Why do cutaneous diseases ordinarily tend to diffusion? Is there a virus, a *materies morbi*, that develops disease here and there, or is the diffusion not generally owing, for the most part at least, to nervous sympathy inducing one part of an organ to take on an action similar to that going on in another part of it? This nervous influence we often see manifested in the generation of disease in an organ sympathizing with the part originally affected. One of the strongest illustrations of this that we ever saw occurred in a case of cancer of the mamma. We had removed the tumour, which was a very large one, and the patient some weeks afterward died of disease in the lungs. On examination after death we found cancerous deposit in the lung on the side from which the tumour was removed. There was a deposit in the skin along the cicatrix, which was shown also by the microscope to be cancerous, while there was none at all in the original seat of the disease. Now why was the deposit made in the lung? Perhaps it will be said that here there certainly was a *materies morbi*, a taint in the blood. Granting this, the question returns, why did it develop itself in that particular locality? There is no vascular connection to account for it. It must be owing to that sympathy between the lung and the exterior of the chest, of which we make a practical use every time that we apply a blister to the chest in the neighbourhood of an inflamed lung.

There are two clinical lectures on four cases of complicated stricture by Mr. Maunder. The details of the cases are given so clearly, and with such comments, that much valuable information is communicated in relation to the minute management of such cases. One of his practical deductions from one of the cases is this: That a bladder may be greatly distended, and yet a fair quantity may be passed daily without emptying that viscus. We believe that mistake is not very infrequently made on this point. Some little time since we attended an autopsy in which an enormous quantity of fluid (some quarts even) was found distending the bladder, and yet the patient was reported daily to the attending physician as having passed sufficient water. We are reminded also of another case, in which a young physician supposed certain apparently grave symptoms to indicate the onset of peritoneal inflammation. An older physician, who was called in consultation, suggested that the bladder might be distended, and that this might be the cause of the symptoms. But it was said that the nurse reported the water to be free. The catheter, nevertheless, was used, and the removal of a large quantity of urine relieved the patient.

There is a lecture also by Mr. Maunder on strangulated hernia, which is marked by the same practical good sense as are those on stricture. He says of the use of opium: "Speaking generally, I may say that this drug is a dangerous remedy *before* reduction, either with or without operation; but a valuable agent *after* reduction. There are exceptions to both statements." He says of its use before:—

"The drug checks vomiting, alleviates pain, and has a grateful influence upon the patient generally. But under these apparently happy effects, a mor-

bid process is steadily at work, and the necessary operation is perhaps only performed when the pathological condition of the hernia renders it no longer capable of performing its function. An untimely dose of opium, besides blinding the unvary medical practitioner to the actual condition of his patient, may have a very unfavourable influence upon the mind of the sufferer himself. To illustrate this statement, I will call to your recollection a case of strangulated hernia, in the person of J. W—b, a patient under my care, in Devonshire Ward, about three months ago. This man had been the subject of hernia for some years, and usually kept it reduced, but once or twice previously it had re-descended for a few hours, but had occasioned no serious consequences. This time, however, the symptoms had been sufficiently urgent, and before I saw him, a dose of opium had been administered with the effect of relieving all pain, and of checking that functional derangement of the stomach vomiting upon which we place much reliance as an evidence of strangulation. He was so comfortable that he at first refused to yield altogether, and at length gave an unwilling consent that if the taxis under chloroform failed, I might use the knife. The operation disclosed a very tight stricture at the neck of the sac. The man recovered."

Mr. Maudsley never uses opium before reduction, unless he has previously determined to effect reduction by operation in the course of a certain space of time, when the taxis, assisted by chloroform or warm bath, fails to do so. In regard to its usefulness after reduction, he thinks that it is almost always of great service in securing repose to the damaged bowel, but that it may do harm when feebleness in the patient disposes to accumulation of gases in the intestines, by disabling the muscular coat in its resistance to the distension; in that case he would omit the opium and give brandy; but we doubt whether the opium should be so entirely renounced, for with the feebleness there may be irritation that needs to be subdued with the tympantitis.

In an article by Dr. Little, containing "Notes of unsuccessful and successful cases of saline alcoholic injections into the veins for relief of collapse of malignant cholera," the notes of eight cases are given exactly as they were taken down at the time, and their fulness makes them valuable, because, with other similar accounts which we hope will be gathered of observations that have already been made, and of others to be made hereafter, they will enable us to come to a right conclusion in regard to the value of venous injections. From the temporary effects produced in cases that ended after all in death, and the manifest bearing of these effects on the final result in the successful cases, we cannot help hoping, with Dr. Little, that further trials—increasing, of course, knowledge and skill—will enable us to pronounce the measure to be very efficient in recovering patients thoroughly from the state of collapse. Dr. Little says, in relation to past trials:—

"When we take into consideration the difficulty of determining with any approach to accuracy, the proportion of the blood that is introduced into the altered blood of cholera patients, with the risk of the injury to blood-vessels, and possibly to other elements of the blood; the paucity of reliable analyses of the blood of cholera patients; the difficulty in making arrangements in private houses and temporary cholera hospitals, for the preparation of materials; the imperfection of the injecting apparatus employed, we may justly experience surprise at the number of recoveries which reward the operators, rather than at the number of deaths which sometimes succeed the operation."

It may be, we would add, that the application of the remedy has often been made later than it should have been, as is often true of other extraordinary remedies in other diseases, and that this is the cause of its alleged

want of success. In Dr. Little's cases three of the eight were cured, and in three of the five cases that ended in death, the patients were pulseless when the injection was used.

It is of importance that the apparatus be properly arranged, and also properly managed. Dr. Little's apparatus is simple, and yet complete and excellent. A representation and full description of it are given. The composition of the fluid which he injected was as follows: Sodæ hydrochloratis ℥ij; sodæ sesquicarb. ℥ij; aquæ destill. ℥xxx, carefully filtered, and subsequently heated. To each imperial pint (℥xxx) immediately before injection, at temperature of 110° to 115° F., two drachms of alcohol were intimately mixed by stirring.

Two gold medals are annually awarded to students for general proficiency in medicine and surgery. The award is made not alone upon an estimate of the relative quality and amount of work done by the candidates in the wards as dressers, &c., but they are obliged to undergo an examination on clinical subjects, and furnish notes of at least six cases. The notes of twenty-two of these cases are given. We notice, in passing, one fault in some of them—the failure to state the amounts of some of the remedies administered. In all accounts of cases we think this point should be quite scrupulously attended to, but it is often neglected even by prominent men in the profession.

Among these reports we find three cases of dislocation of the femur on the dorsum of the ilium. The plan of reduction which it is said is "almost always adopted with success at this hospital," is thus described: "The pelvis was steadied; the leg flexed on the thigh: the thigh adducted and flexed on the abdomen; abduction was then commenced, and during this the head of the bone slipped into the socket." There is a remarkable resemblance in this to a description given of a reduction of the same dislocation, effected probably more than fifty years ago by Professor Nathan Smith, of New Haven. It is thus stated by his son, Professor N. R. Smith, of Baltimore: "After attempting the ordinary methods by extension in vain, he bent the leg upon the knee, seized the leg, and, using it as a lever, rotated the thigh a little outward. Then he gently abducted the thigh, and lastly flexed it freely on the pelvis, by carrying the knee toward the face of the patient. These movements instantly succeeded, and with but little effort of strength."

There is a short paper by Mr. Mannder, containing a description, with a plate, of a lithotripsy syringe, which we commend to the notice of surgeons.

An account is given of a case in which gastrotomy was performed by Mr. Curling, for stricture of the œsophagus. Here was attempted to be done by design what was done accidentally in the famous case of Alexis St. Martin. But the circumstances of the two patients as to general condition were entirely different. St. Martin was in good health at the time of the accident; but the patient of Mr. Curling had suffered from the disease in the œsophagus for a long time, and had not only become much exhausted and emaciated for the want of nourishment, but his digestive organs had become thoroughly deranged. Then the operation was delayed till the exhaustion was so extreme that the skin was cold, and the pulse was exceedingly feeble and intermittent. He died in thirty-two hours after the operation, not from peritoneal inflammation, but from sheer exhaustion, as should have been expected as a matter of course. It was of no use to perform such an operation on a patient so utterly exhausted.

The same error is often committed in other diseases—as, for example, croup. We would not discourage resorting to an operation if there be the least ground of hope from it, where other means have failed; but we are decidedly opposed to such a measure when it does not offer even the shadow of a hope. It is not enough to say that the patient will surely die if it is not done. If he will surely die whether it be done or not, the surgeon has no right to do it. Some, perhaps, will think that there is no occasion for these remarks. We think that there is. There is a looseness in the ideas of some on the point in question. We have known operations to be performed where there was not the least ground for expecting relief from them. In many of the cases where a surgical operation is resorted to because the medical means have failed, it should have been resorted to before; and the reason that it was not done in time is commonly this: When the physician fairly comes to the conclusion that there is nothing more to be hoped from medical means, there is apt to be delay from various causes—as effecting due consultation, spreading the matter before the friends and before the patient, if he be an adult, &c.—and all this time the chances for affording relief by an operation are diminishing. The time to do it is when the conclusion above referred to is arrived at; and when the necessity for an operation is probable, arrangements should be made beforehand, so that if the necessity comes there may be no delay.

A very suggestive paper on "Marriages of consanguinity in relation to degeneration of race," is by Dr. J. Langdon H. Down, assistant physician to the hospital. It is a very prevalent opinion that such marriages are uniformly productive of evil to a greater or less extent. Dr. Down does not believe this to be true. His observations are quite extensive, his notes referring to 1138 cases of idiots. A strong point which he makes is, that there are other causes which are largely to be taken into the account. To illustrate this he gives some particulars of twenty cases of idiocy taken at random. His general conclusion is thus stated:—

"Consanguinity has doubtless the power of aggravating any morbid tendency, as I believe it has, of perfecting any good quality. Any statistics on the results of the marriage of relations are of doubtful value, unless they give the life-history of the progenitors. What a different aspect the whole matter assumes when this plan is adopted, will be apparent to the readers of this paper. Whenever a similar investigation is made, I believe it will be found, as in the subjects of my own inquiry, that consanguinity is only *one* of the factors, and not the most important one, in the production of deterioration.

"If our advice be sought, it will be our duty to inquire into other elements which are less on the surface, but which have equal or even greater potentiality for evil.

"Alliances, such as I have exhibited, with hereditary disease on both sides, should be discountenanced even where there is no element of consanguinity. It would only be a part of a true philosophy to render more forcible our opposition where blood-relationship would have a well-determined tendency to aggravate the wrong."

A similar opinion, derived from observations in the village of Batz, where marriage among near relations is of very frequent occurrence, has been given by Dr. Auguste Voisin, physician to the Bicêtre Hospital, Paris, a notice of whose book the reader will find in the January number of this Journal, p. 232.

Dr. Down also contributes a short paper on the ethnic classification of idiots. He does not go into the subject fully, but suggests enough to prompt farther investigation in that direction. He says that "a con-

siderable portion can be fairly referred to one of the great divisions of the human family other than the class from which they sprung." The Mongolian type he finds in more than ten per cent. of the cases. If he is strictly correct in his observations there is some truth in the following remarks with which he closed his paper:—

"Apart from the practical bearing of this attempt at an ethnic classification, considerable philosophical interest attaches to it. The tendency in the present day is to reject the opinion that the various races are merely varieties of the human family having a common origin, and to insist that climatic, or other influences, are insufficient to account for the different types of man. Here, however, we have examples of retrogression, or at all events, of departure from one type and the assumption of the characteristics of another. If these great racial divisions are fixed and definite, how comes it that disease is able to break down the barrier, and to simulate so closely the features of the members of another division? I cannot but think that the observations which I have recorded, are indications that the differences in the races are not specific but variable.

"These examples of the result of degeneracy among mankind, appear to me to furnish some arguments in favour of the unity of the human species."

In a lecture on cases of cerebral hemorrhage, by Dr. J. Hughlings Jackson, there are scattered through it some very sensible practical remarks on the values of different symptoms; the relations of this difficulty to disease in other quarters of the system; and the importance of recognizing fully the general condition of the patient. On this last point he thus remarks in relation to a patient, W. K.,¹ who is the chief subject of his lecture:—

"The patient I shall show you, at the close of this lecture, has, no doubt, for years been getting into a condition in which the vessels of his brain would readily give way. Frequently, however, our patients know nothing, or they think little, of the serious changes which render them liable to such accidents. Their tissues become so universally, and yet so slowly, lower in vitality, that there are no particular failures to obtrude themselves until something gives way, or until some part becomes inflamed. And when a patient comes to us for 'winter cough,' I fancy even we may think too much of his temporary bronchitis, as he is sure to do, and too little of his permanent emphysema. If he consult us for pneumonia or pleuritis, we must not think we have got to the bottom of the matter by saying he has taken cold. A patient's pleura is not a thing apart from him, but a piece of his body; and when we hear a friction murmur, we must not treat *it*—if I may say anything so grotesque—but the inflamed pleura, and the man of whom it is a part. It, doubtless, simplifies matters, in a superficial sense of the word simple, to know that there is lymph effused, and to think of mercury, and to try to get the lymph taken up. Just so, it is very loose talk, talking of treating hemiplegia, for hemiplegia is not a constant quantity. Yet, the man who thinks of hemiplegia as an entity, and gives what he has found 'good for hemiplegia,' will have a certain kind of satisfaction. But it makes one less confident in the treatment of diseases of the nervous system to define severely when we can, the internal changes on

¹ We have, in the account of this patient, a little insight into the drinking habits of the English. Thus Dr. Jackson says: "W. K. had, he said, been 'amongst beer all his life.' Yet, for a brewer's servant, he had been temperate. He had drunk only five pints of beer a day, and 'a chance drop of spirits now and then.' It may seem odd to call this great excess 'temperance;' but I speak comparatively. I have now under my care for epilepsy a young man, also a brewer's servant, who says he has been in the habit of drinking twelve pints of beer daily. A gallon a day is not a very uncommon allowance. He got his beer for nothing, and it rarely occurs to patients in this rank of life, or in one a little higher, that now and then fluids, which cost much, had better be poured down a drain than down their own throats."

which the outward symptoms depend. When we can, as it were, *see* a great brutal clot, or a large, irregular, yellow-stained cavity, in the motor tract, we are less hopeful."

Again he says:—

"It is wonderful how long bad materials will sometimes keep together. It may be, that although the patients are unsound, their general unsoundness is conservative. There is no healthy organ left to overwork the unhealthy ones. These patients descend into a lower sphere of vitality altogether—one which will do for routine work, for fair weather and for easy circumstances. The healthy human body, as Mr. Paget says, is fitted for the storms as well as for the calm of life. But patients like W. K. have no spare vitality, and, as I have said, are ready to give way under unusually unfavourable circumstances. They are ready to die at any point. A man with chronic Bright's disease may die of apoplexy, of bronchitis, of uræmia, of pericarditis, &c. &c., but to look on the pericarditis, apoplexy, &c., in such cases as idiopathic, as essentially different things, rather than as different events, depending on one general condition, would be to think, as those historians seem to think, who write history from the reigns of kings, from battles and other striking events. It would be as reasonable to consider the outbreak of the French revolution as idiopathic, as it would be to consider W. K.'s attack of cerebral hemorrhage as idiopathic."

These remarks are very timely. Since the introduction, to so large an extent, into pathological investigation of the means of discovering what is local in disease, there has often been an undue tendency to look at the local to the disregard of the general condition. It is agreeable to both physician and patient to find something definite. Not only is it satisfactory, but it saves thought thus to narrow observation. It is at the cost of mental labour that all the intricacies of the complications of disease are ferreted out, and the condition of the patient, as a whole, is arrived at. And farther than this, great damage is often done to the patient by the undue localizing of disease. For example, we have known many a patient to have a prolonged sickness with her mind fixed upon her diseased womb, when we have no doubt that she would have had a comparatively quick recovery if she could have had all idea of that organ blotted out of her brain. We would not be understood as deprecating the use of the speculum, but only its abuse. While there are many cases in which undoubtedly the grand difficulty is a local one, situated in the uterus, there are many others where, with other local or general derangements, there may be some slight disease of this organ, wholly subordinate, and easily removed with very little direct treatment, or with even none at all, but indirectly by the removal of other difficulties. It is in these last cases that the error we refer to is committed. It would be interesting to illustrate the same point by reference to diseases in other quarters of the system—as the lungs and the heart—but this is not necessary. The illustration which we have given of the prevalent tendency to make too much of local disease, is at the present time, perhaps, more often met with than any other; and we may add, that it is found often connected with quackery, and with what is quite as bad, if not worse, semi-quackery.

In a paper by Dr. Fraser, on *Delirium Tremens* with a record of eight cases we find nothing new. We believe with him that "without the action of alcohol there can be no *delirium tremens*." Other forms of delirium may resemble this in some particulars, but there are always some clear points of diagnosis. No one ever ought to make a mistake here. We do not believe, as many teach, that this disease uniformly arises from an abstraction of the usual stimulus. As it is apt to occur in an exhausted condition,

as, for example, when the drunkard has been debilitated by sickness of any kind, so the exhaustion occasioned by the withdrawal of his stimulus may produce it; but it is by no means certain to do it, as the experience of jails and workhouses shows, and farther than this, the disease often comes on when there has been no letting down of the usual daily amount of stimulus. We do not at all agree then to this statement of Dr. Fraser.

“The point is whether the proximate cause is an excess of alcohol circulating in the blood, and acting lethally in the nerve centres; or from the deprivation of an accustomed stimulus, by which the tone of the nerve centres is morbidly lowered. This question is not one of theory merely; but also of treatment, as to whether stimulants are to be given, or withheld; for it is clear, that if an excess of alcohol is in the blood, instead of adding, we ought to eliminate; and, on the other hand, if the symptoms arise from a diminution of power in the nerve centres, owing to the absence of an accustomed stimulus, then alcohol will be the remedy.”

This disease is not the result at all of alcohol now present in the circulation “acting lethally in the nerve centres;” neither does it arise simply “from a diminution of power in the nerve centres, owing to the absence of an accustomed stimulus.” But it depends upon a peculiar condition of the nervous system induced by the continued irritation of alcohol. There may be nervous depression connected with it—there certainly often is—but we cannot say that it is essential to it. And as a matter of fact, some cases require stimulants, while others most generally do not. There is no one cure for the disease, and the most successful treatment is not that which follows any one mode, but which, proceeding upon general principles, accommodates itself to the varying conditions and complications that the disease presents. We distrust, therefore, all statements in praise of any one remedy or mode. We do not believe in large doses of digitalis, just now becoming quite fashionable. It may, for aught that we know, do as well as other exclusive modes, though we doubt it. In our experience, including the practice of other physicians as well as our own, delirium tremens is very apt to be recovered from, if it have no grave complications. We are not inclined, therefore, to resort to extraordinary means unless it can be distinctly proved that they are more successful than ordinary ones. Thus far we think that the most that has been proved in regard to digitalis is, that patients sick with delirium tremens sometimes are able to bear very large doses of it. But is it perfectly clear that some are not injured by it, as some have been by the large doses of opium, which, after the recommendation of Sutton, were some time ago administered so commonly by the profession at large? Digitalis was given in two of Dr. Fraser’s cases—in one in which recovery occurred, but to what the recovery is to be attributed, Dr. Fraser is doubtful, because laudanum and chloroform were used as well as digitalis—and in the other, in which death resulted, the only medicine given being digitalis in large doses, and as the right side of the heart was found much dilated and the walls thinned, Dr. Fraser, inquires whether the effect of the digitalis was “too depressing upon an already weakened and dilated heart,” in opposition to the doctrine that has lately been taught in regard to its action, which after all he thinks some facts favour.

There is a statistical report by Mr. Hutchinson, the surgeon to the hospital, of the deaths that occurred among his patients during the year 1865. The number of patients was 1,212, of which 81 died, a ratio of $6\frac{2}{3}$ per cent. After a general table, there are particular tables of classes with quite full items. There is also a complete table of the cases of strangulated hernia

for the year. There are also full classified statistics of all the major operations performed during the same year.

In a contribution by Mr. Hutchinson, on the results which follow injuries to nerve-trunks, there are full details given of seven cases. The observations were made some weeks after the injuries were inflicted, when in most of the cases the wound was healed. One very marked result was a remarkable loss of heat in the part which had lost sensation. The difference between the paralyzed and healthy parts, he found generally to be from six to ten degrees. It varied much with circumstances, because the temperature of paralyzed parts is very much at the mercy of external influences, the cold affecting them decidedly, while at the same time no applied warmth can raise them to the same temperature that it produces in the corresponding healthy parts. On the cause of this loss of heat Mr. Hutchinson thus remarks:—

"To what are we to attribute this remarkable loss of power to sustain the normal temperature, and to guard against the depressing effects of external cold? To say that it is the result of mere 'sensory' unsatisfactory, for we find it just as marked where one finger is contrasted with the others on the same hand, as when the whole hand is affected. One of my cases (Case 1.) is almost crucial in this respect, for the man had lost a finger and thumb, and used neither of them, yet the finger deprived of nerve influence registered ten degrees lower temperature than the thumb which yet enjoyed it. To allege that it is due to dilatation of the smaller arteries and consequent slowness of the circulation is scarcely more satisfactory, since paralysis of the vasomotor nerve, and consequent dilatation of the vessels is well known to lead to *increase of temperature*. Yet it is quite certain that the capillary circulation is in some way greatly disturbed. If you chill the part it becomes not merely pale, but livid; if you warm it, it becomes not only bright pink, but of a peculiar dull brick-red colour. The most plausible explanation seems to be, not that the nerve-control over the vessels is at fault, but that the *vasa frontia* is itself much diminished."

He supposes, and we think with good reason, that there occurs a change in the endowments of the cells of the paralyzed part from the lack of nervous connection, and that there is in them less disposition to growth and nutrition, making the circulation to be less active, and so occasioning a loss of animal heat. This condition of things seems not only to permit inflammation to occur, but to predispose to it, so that circumstances readily produce it. A peculiar kind of whitlow appearing on the tips of the fingers, was quite common in cases of section of the nerves of the forearm, in one case coming simultaneously on four fingers, which of course could not be owing to any accidental cause, as some pressure. It is reasonable, therefore, also to conclude that the inflammation of the eye, so apt to occur in paralysis of the fifth nerve, the formation of bed-sores and the occurrence of cystitis in paraplegia, are not altogether owing to accidental influences, but come in part from the lesion of the nerves.

Following this is a very instructive article entitled "clinical and pathological facts in reference to injuries to the spinal column and its contents." From the cases of the past two or three years, a selection has been made of those which illustrate important points in diagnosis, treatment, or physiological influence, nineteen cases in all. "The cases of recovery have especially been collected, with the view of illustrating the important fact, that even in severe cases, with permanent local displacement, and with paraplegia lasting some weeks, complete recovery may ensue." The cases of recovery are ten in number, in some of them it being incomplete. "Many of the cases give important information as to the kind of displacement

which is most common, and its usual effects upon the cord, and illustrate clearly the inapplicability of operative interference. In no single case," it is added, "has any operation (other than attempts at reduction) been performed at this hospital."

In a lecture by Mr. Hutchinson, on the same subject, he urges very strongly this abstinence from operative interference. "My chief reason," he says, "is that, in operating, you convert a simple into a compound fracture, and add the risks of pyæmia, together with those of spinal meningitis. Then, I urge that depressions of bone very rarely exist, perhaps not once in twenty cases, and that it is utterly impossible to select the case." Again, he says, "My assertion is, that a good many cases recover, if put under favourable circumstances and let alone, and that of those which end in death very rarely, indeed, can it be asserted after *post-mortem* examination that an operation could by the barest possibility have done any good. In the great majority, then, since it could have done no good, its effect would have been to increase the patient's sufferings, and aggravate his danger." In regard to the infrequency of depression, he supposes that when the accident is so severe as to crush the spinal cord, generally the bones have sprung back by their own elasticity and that of the intervertebral substance, or that the displacements have been remedied by the mere straightening of the neck and trunk, which common sense dictates as the first thing to be done, and that where neither or both of these suffice, the replacement is commonly impossible. He says, also, that although much has been said about large effusions of blood into the vertebral canal as a cause of paralysis, such effusions are, he believes, the rarest of occurrences, for he has "never seen any effusion to the extent of possible compression, and in the majority of cases there is little or none." On this point, he remarks:—

"The injury is a crush, and is not one at all likely to cause much bleeding. There are no large arteries to be injured. When you examine a specimen of fractured spine, you will find the muscles and soft parts externally much ecchymosed, there will be also a few small blood-clots adhering to the edges of the broken bones, but there will be little or no blood between the bone and the theca, and none at all in the thecal cavity. I speak of what is usual, and am well aware that exceptions may occur. The theca (*dura mater*) is very rarely torn, and often, on exposing it, you might imagine that the cord was not injured. Nay, even further than this, you find the pia mater of the cord entire and without ecchymosis, and only on slicing the cord through do you discover that its substance has been utterly smashed. I show you a sketch of a cord thus injured. You will see that the cord-substance, for nearly an inch and a half, is reddened by effused blood, and its substance broken into a diffuent pulp. Yet, in this instance, the pia mater was still entire."

There are many interesting points brought out in relation to the effects produced by injuries of the cord which we would like to notice if our limits would permit. We cannot forbear to quote a part of what is said of loss of sensation:—

"If paraplegia be imperfect, you will always find that the patient retains more sensation than motor power. Sometimes he will appear to have lost motion utterly, and to retain sensation almost perfectly. This difficulty, in extinguishing sensation, is observed, I believe, in all diseases and injuries, whether of the brain or the cord. To a considerable extent it is, perhaps, apparent rather than real. Sensation is merely passive, motion is active, and the latter probably requires a far more efficient condition of the nerve-apparatus than the former. With a partially crushed spinal cord we may easily suppose a patient unable to transmit the orders of his will through the damaged portion, whilst still a certain degree of passive sensation (requiring no exertion of his will) may remain.

Another source of fallacy is the difficulty of accurate observations. A man tells you, 'I cannot move my legs,' and you are unable to prove the contrary, though it is still possible that a very vigorous exertion of the will might be able to set certain muscles in action; in other words, that voluntary motion, although seemingly in abeyance, is not absolutely lost. The same patient tells you that he 'can feel well,' yet very probably, if you try accurate tests, such as the compasses,¹ or drawing a hair or a feather over the surface, you will find that his sensory function is very far from perfect. On account of our frequent neglect of such tests we are compelled to receive with much qualification, recorded statements as to 'perfect sensation' being retained after these accidents."

We quote also what Mr. Hutchinson says of the use of the catheter, as worthy of consideration, though we think that, at the least, he makes too much of the influence of it in producing cystitis. The tendency of the injury is, as he states, to produce the disease, and the question is, whether this tendency is more decided with the use of the catheter, or with the distension of the bladder consequent upon not using it—a question which can be settled only by a careful comparison of many cases, such as remains to be made by Mr. Hutchinson and others, who have large opportunities of observation in this class of accidents. The passage is as follows:—

"There is, I think, room for much doubt as to whether the usual practice of relieving the bladder by the catheter is judicious. In a few cases where the fracture is in a certain part of the lumbar region, the bladder is involved in hyperæsthesia, and the pain caused by its distension, necessitates interference. These, however, are very rare, and, in almost all cases, the bladder fills without causing any discomfort whatever, and when full runs over. After a few days it regains a certain amount of tone, and empties itself very frequently. At this stage we have troublesome incontinence, and but little retention. Now, if the catheter be used from the first, inflammation of the urethra and bladder is, I think, almost certain to occur, and the urine will become loaded with pus and mucus. I suspect that cystitis is, in some cases, one of the influences which brings about the patient's death by exhaustion. Not unfrequently ulcerations of the mucous membrane of the bladder occur. There is a specimen in the Museum of a bladder and rectum from a fractured spine case, in which a fistula passes from the membranous urethra into the rectum, no doubt, in connection with the use of catheters. Why should cystitis thus constantly follow the use of catheters? Seeing that there is no impediment to the introduction of instruments, that they give the patient no pain, and are used with the greatest ease, why should they produce so much more irritation than we usually observe when they are employed for other reasons? I think we must admit, that it is probable that the mucous membrane of the bladder, when paralyzed, is in a state specially prone to inflame, just as the eye is, after paralysis of the fifth nerve. The practical question before us is, whether to permit the retention to continue until overflow takes place, is less likely to cause this cystitis than is the use of instruments. My own experience has been in favour of non-interference, and I quite intend, in the future, to make a full trial of this plan."

There is an appendix to the volume made up of notes on the cholera epidemic of 1866. As soon as it broke out, arrangements were made by the staff of the hospital for 38 beds in one of its wards, but this accommodation proving inadequate after the lapse of a week, two other wards were added, containing each 50 beds, making in all 138 beds for the exclusive reception of cholera patients. The largest number, however, at any one time in the hospital was 114. The whole number treated from July 10th to August 30th was 509, the deaths being 281, or 54.9 per cent. No

¹ The æsthesiometer, devised, I believe, by Dr. Sieveking.

cases of diarrhœa, however severe, were included in this statement. The mortality decreased week by week, it being the first week 85 per cent., and the last week 37 per cent. The gradual diminution of the mortality is accounted for by the difference in the severity of the cases. At the outset of the epidemic, most of the patients were brought in in a state of extreme collapse. "This epidemic," says Dr. Fraser, "began suddenly, raged fiercely, culminated sharply, and declined rapidly, as cholera has hitherto generally done, fitly represented by an ascending angle of 45° , and descending by one of 95° ."

We will not enter into the discussion of the question whether cholera is contagious in view of the facts stated in the reports contained in this appendix, for such discussion, properly carried out, should take in the consideration of a wide range of facts accurately gathered. No narrow view of even well-observed facts, much less those which have been carelessly observed, will settle the question. We will give but a single quotation in relation to this subject:—

"Some facts may be stated bearing on the question of contagion. At the height of the epidemic, upwards of one hundred persons were employed in the cholera wards; seven medical officers, five volunteer nurses, five sisters, eighty nurses, and five porters. None of the medical officers, volunteer nurses, or sisters, were attacked, and the porters enjoyed a like immunity. Of the nurses five contracted the disease, and of these four died. Three of those who died slept outside the hospital. In the laundry eleven women were employed in washing the linen, etc., from the cholera wards, and of this number, one was attacked and died. She was also a non-resident. As the mortality among laundresses is usually very large in a cholera epidemic, it would seem that the preventive measures adopted were not altogether ineffectual. No case of cholera occurred in the general wards of the hospital, although during the whole period of the epidemic, they contained their full number of cases, most of whom came from cholera localities."

The preventive measures referred to are those usually employed in the various modes of disinfecting, and these were employed very thoroughly.

Something is said of many of the remedies used in the treatment of cholera. Calomel is very decidedly recommended as having been found efficacious. Baths, at a temperature of from 98° to 104° F. were used with most marked effect in about 130 of the worst cases under the care of one of the physicians. The effects are thus described:—

"Cramps ceased, anxiety of mind vanished, pulse returned, or, if originally to be felt, increased in volume and frequency. Many who had before moaned or shouted incessantly with pain, began to converse upon indifferent subjects, or in many cases sank into a tranquil slumber. Often recovery appeared to be the direct consequence of the bath, the improvement being permanent; but in many more, removal from the bath became the signal for the return, more or less rapidly, of the former symptoms."

Dr. Little, whose report of the effect of saline and alcoholic injections into the veins in the epidemic of 1849 we have noticed in another part of this article, followed up this practice in the present epidemic. He used now another apparatus, of which he gives a figure, one advantage of which is, that the operation can be readily performed with it by a single person. He reports fifteen cases. We find nothing new in the results as compared with those realized in 1849. He says, in concluding his report:—

"I may state my conviction that a patient (if not too old, nor suffering from severe organic disease), however urgent may be his symptoms, if they have not been of too long duration, has, if injected with saline alcoholic fluid, a very good

prospect of recovery. Often it is also his only chance. This belief is shared in by those who have seen my cases. The patients, however, require careful watching, and if the pulse is going, immediate reinjection again and again is necessary. When a patient has been long pulseless, clots form in the heart, and, as I have seen, in two cases where injection was attempted, extend into the larger veins. In one case the fluid would not flow in, and only distended the veins of the arm injected. After death clots were found extending from the heart into the axillary vein. I have no doubt that in some of my earlier cases clots existed in the heart at the time of the injection. During the last three weeks many cases, not nearly so severe as those injected, have died; they have generally got over the collapse, but succumbed to the reactionary fever. Had those been injected, in all probability the event would have been different. The bad results, with this treatment, are due to the fact that it is often only employed when the patients are in *articulo mortis*, under the impression that the injection is dangerous. This it is certainly not."

This may be speaking too strongly, but it is our own conviction, that a measure which will restore the pulse when it is entirely gone, diffuse warmth throughout the cold body, disperse the livid hue, replace the whispering utterance with almost the voice of health, remove the cadaverous expression of the countenance, and relieve the cramps, the vomiting, and the thirst, is of considerable value, and should not be cast aside simply because it does not succeed in the majority of cases in which it is used. And this conviction is strengthened by reports of cases where the injection was used successively several times with the same results, the patient recovering apparently in consequence of this repetition of the remedy.

We have not noticed all the articles in this volume, but have selected those which contain points that would most interest the readers of this Journal. We thank the Medical and Surgical Staff of the London Hospital for this contribution to our science, and shall hereafter look for their annual volume with great interest.

W. H.

ART. XV.—*The Transactions of the American Medical Association.*
Instituted 1847. Vol. XVII. Svo. pp. 713. Philadelphia, 1866.

THE *Transactions* before us, like those of former years, commence with the address of the presiding officer, who, at the present session, was Dr. D. Humphreys Storer, of Boston, Mass. Its theme is the practice of Specialities in Medicine. The question is one of great importance, and which, taken in all its bearings, is one not very easy of solution. Dr. S. treats it with the utmost candour and fairness. The question may be considered under two points of view. The first embraces the propriety of a course of medical education directed solely to the devotion of the pupil, subsequently, to the practice of some speciality—to the exclusive treatment of a particular class of diseases, or the diseases of a single organ or series of associated organs. Such an apology for medical education in the proper acceptation of the term should be unhesitatingly condemned. So closely are the pathological conditions of every portion of the organism related to each other—so powerfully does the abnormal state of one organ or set of organs influence the functions of many or of all the others, that, without an acquaintance with the general pathology and therapeutics of the entire living system, it is impossible to form a correct estimate of the special pathology and therapeutical management of the diseases of particular organs.

To the second point of view under which the question of speciality in medicine presents itself, there can be much less objection. We mean the devotion of time and talents, after a sufficiently prolonged attendance upon a liberal course of medical instruction, and graduating, to the especial study and treatment of such of the branches of his profession as may have for the individual a particular interest, or which from any circumstances may awaken an especial claim. To pursue such a course all have a perfect right, and there can be little doubt that when the attention of any one is directed somewhat exclusively to a single department of medical investigation, or to the careful clinical observation of a single disease, or class of diseases, a closer acquaintance will be acquired of the nature, causes, symptoms, and complications of the morbid conditions thus studied, and of the therapeutical management best adapted to relieve the suffering to which they give rise, to circumscribe their ravages, and conduct them to a favourable termination.

The dangers and abuses to which the toleration of specialities in the study and practice of medicine is liable to lead, are clearly pointed out by Dr. S. He would not, however, discountenance the specialist as such; he would not speak disparagingly of him; he would neither ridicule nor condemn him, but would cheerfully welcome as a co-laborer to our ranks every well-educated, honourable, honest physician, to whatever portion of our science he may devote his time and his talents. Every atom he can add to our stock of knowledge, every grain he can place upon the mound already raised should be appreciated and rejoiced in; and as long as his conduct shall prove him worthy of our esteem, so long may he claim and possess it.

The first of the scientific papers is one on the Relations which Electricity Sustains to the Causes of Disease. It was presented by Dr. S. Littell, of Philadelphia, and discussed at the last annual session of the Association, but was not fully prepared for publication until the meeting in 1866. Dr. L. assumes that it is to the morbid influence upon the living organism of certain electric conditions of the atmosphere in circumscribed districts or neighbourhoods, or throughout more or less widely-extended regions, that we are to look for the principal cause, if not the only one, of diseases of an endemic or epidemic character. The question, which is certainly one of the deepest interest and importance, particularly in our study of the etiology of very extensive classes of diseases, is very ingeniously argued by Dr. L. The correctness of the position he has assumed is not, however, satisfactorily demonstrated.

The theory advocated by Dr. L. is by no means a novel one. Electrical fluctuations have been assigned by not a few, and with more or less confidence, as the cause of certain maladies. Few attempts, however, have hitherto been made to show by argument and facts the ground upon which such assignment was made, nor has the electrical cause of disease been so fully developed, nor has it received so extended an application as is given to it in the report before us. As Dr. L. admits, "Much patient investigation, however, and careful induction will be required to remove all doubt, and secure its adoption by the profession."

The report of the Committee on Disinfectants (Drs. E. M. Hunt, A. N. Bell, and J. C. Smith) follows next. Of the main subject it discusses, and the several important questions therein involved, the report presents but a very general outline. The views presented by the Committee are in the main correct, but these are presented too much in the form of axioms to be received without argument. We are prepared to admit that "where

well-regulated heat and perfect ventilation can be secured, we are in possession of all needed disinfecting powers under usual, or, we should say, under all circumstances, especially if perfect cleanliness of room, bedding, clothing, and person be added, excepting perhaps where a number of diseased persons are crowded together. In the latter case, the only disinfectant to be depended on is the separation of the sick, and placing them in a pure, dry atmosphere of a proper temperature."

The Committee present a list, with a brief commentary, of the substances which they regard as worthy of a notice, more or less extended, as their tested merits or assumed value may demand. Many of these substances are adapted to furnish, doubtless, important aid as auxiliaries in the work of disinfection; others of them will be found, we suspect, to be rather deodorants than disinfectants, in the proper acceptation of the term. We are not prepared to admit what the Committee would seem desirous to inculcate, that to remove a disagreeable or disgusting odour is, in all cases, equivalent to destroying the agent or source of infection.

In a very short paper by Dr. B. F. Craig, the use of the Permanganate of Potassa is recommended "for the purification of water, especially during the prevalence of epidemic cholera."

An Apparatus for the Treatment of Fractured Patella is described by Dr. J. M. Boissot. The principle involved in the use of this apparatus is not new, being that of holding the parts in juxtaposition, by drawing upon the upper fragment in such manner as to bring it down, while the lower is held steadily. The form of the splint is that of a double inclined plane. Such a splint, keeping the leg *slightly* flexed, causes the patella to remain above the anterior depression between the condyles of the femur. The broad concave surface of the upper portion of the splint forms a comfortable support for the thigh posteriorly, while it serves as a point for counter exertion. The same may be said of the lower portion of the splint in its relation to the leg, with the additional recommendation of its not pressing upon the heel or tendo Achillis. The upper fragment of the patella is drawn down by pieces of leather, with attachments of common cord, which pass over pulleys to rollers notched, and provided with a spring, so that they may not slip in winding. The splints are confined to the limb at each end, by a slip of ordinary three-inch bandage. The description of the instrument is deficient in clearness from the want of any pictorial illustration.

A report is presented by Dr. J. J. Woodward, on The Causes and Pathology of Pyæmia (Septæmia). All that Dr. W. has attempted in this report is to bring together a few considerations in connection with the literature of pyæmia, to offer a brief summary of the leading explanations of the phenomena which have been propounded, and a criticism of the basis on which they rest, with a few hints on further explanation. The report concludes with a sketch of some of the more prominent forms of non-surgical pyæmia, especially uterine pyæmia, that of new-born infants, that originating in intestinal ulcers and other lesions of the portal system, and the so-called idiopathic or spontaneous pyæmia.

We regret that Dr. W. had not been able to command the time requisite to present a complete monograph on pyæmia, instead of being forced to limit himself simply to a sketch of what others have done with a view to determine its true pathology. From the hints thrown out in discussing its literature it is evident to us that he is prepared to advocate a pathology of pyæmia far in advance of that entertained by a majority of his contemporaries.

The next communication is on The Clamp Shield, an instrument designed to lessen certain surgical dangers, more particularly those of extirpation of the uterus by abdominal section, by Dr. H. R. STORER, of Boston. This instrument consists of two jaws like the cutting blades of a pair of large shears, with a serrated edge where they come in contact, of the breadth of half an inch at their centre, and gradually tapering at their outer edge towards both the ends. The upper end of one blade is elongated into an odontoid process, which passes through a corresponding socket in the other; the upper end of this process is curved outward, so that when the jaws are closed it tends to hold them in position. To the lower extremity of each jaw is attached, by a ball and socket joint, the blade of a pair of narrow forceps. The blades of the forceps are united by a clasp, the pivot rotating upon its axis so as to allow closure at any angle. To the lower end of the right blade of the forceps is hinged a rod with a screw, which passes through an opening in the opposite blade. A nut on the outside of this blade, working on the screw-like rod, is capable of exerting whatever amount of pressure may be deemed advisable.

Dr. S. sums up the grounds upon which the clamp shield is to facilitate the operation for removal of the uterus and to lessen its mortality as follows:—

"I. *As a Clamp*.—It lifts the uterus, so as to bring as much as possible of the cervix within its grasp. 2. It enucleates the portion to be divided from the surrounding tissues. 3. It aids and increases the action of the ecraseur, indirectly controlling or preventing hemorrhage, and thereby, also, 4. It lessens the number of ligatures necessary to be subsequently applied.

"II. *As a Shield*.—5. It protects the tissues beneath and around it from being lacerated. 6. It prevents outlying vessels from being unnecessarily divided. 7. It covers the bladder, the vagina, and the rectum, and so avoids the causation of increased shock, and in case this is recovered from, of increased subsequent danger.

"III. *In its twofold Capacity*.—8. It relieves the surgeon's mind during the operation from all fear of the dangers above indicated. 9. It enables him cheerfully and hopefully to undertake many doubtful or desperate cases from which he would otherwise shrink in dismay, or which he could not, in conscience, undertake; and, best of all, 10. It, for all these reasons, tends to increase the number of cases attempted to be cured, and to lessen the mortality of those in whom the cure may become realized."

The next paper is on The Intra-oral Method of Operations on the Lower Jaw, by Dr. Dewitt C. Enos, of New York. A short account is first given of the mode of operating within the mouth, then a brief history of the employment and success of this plan of operating; the paper closing with a view of the advantages by which it is recommended. These are the avoidance of an unsightly and perhaps irritable cicatrix. The better preservation of the normal shape of the jaw, not only causing less deformity, but rendering its usefulness in mastication greater, since its usual coaptation with the superior maxilla is maintained. The less liability to sudden asphyxia by the retraction and swallowing of the tongue during the operation, and by removing, also, the more formidable and chronic form of asphyxia alluded to by Bégín; the non-division of the facial vessels and nerves, consequently the less hemorrhage and the better preservation of facial innervation.

Next follows a report by George M. McGill, Assist. Surg. U. S. A., advocating the adoption of A Periosteum Flap in all amputations in the continuity of a limb.

Since January, 1863, Assistant Surgeon McGill has adopted this flap in

all his amputations in the continuity of bones. A flap of periosteum is outlined, raised, and adapted to the newly-cut bone surface. This flap intended to cover and unite with the newly-divided bone surface, as skin and superficial fascia are intended, in certain modes of amputation, to cover and unite with soft tissues; with this difference, however, that in a periosteal flap we have a homologous structure, to unite with the newly-cut surface of bone; while in the case of skin and fascia covering soft tissues, union is demanded of heterologous forms. Granting that *like* more readily unites with *like*, then where a periosteum flap is adopted and the newly-cut surface of the bone has not been killed by the too coarse teeth or the too rapid action of the saw, we are more likely to have union by the first intention. This *a priori* conclusion is sustained by the series of cases adduced by Assistant Surgeon McGill; for the details of which we must refer to the paper itself.

An interesting and instructive case of Paralysis of the Vocal Chords with Aphonia is related by Dr. J. SOLIS COMEN, of Philadelphia. The paralysis in this case was overcome by direct stimulation in a single operation, and the voice was restored at the same sitting by vocal gymnastics.

The Report on Vesical Calculi, by Dr. J. C. Hughes, of Iowa, is based upon a case in which lithotomy by the bilateral method was performed successfully four times, within a little more than five years in a patient aged, at the time of the first operation, 62 years. The patient is still active, in his 74th year, and enjoying comparatively good health. At the first operation two calculi were removed of the triple phosphate variety; at the second, one calculus; at the third, four calculi, one of which was located in the fundus of the bladder and encysted; at the fourth operation twelve calculi were extracted. Of the entire nineteen calculi accurate lithographic drawings are given, showing their respective shapes and sizes.

Dr. L. A. Sayre, of New York, relates a case of Luxation of the Femur into the Ischiatic Notch, of Nine Months' Standing, Reduced by Manipulation.

Dr. Alfred C. Post, of New York, describes an Instrument for Performing Lithotomy by a Bilateral Section of the Prostate, devised by him to secure the advantages of the gorget, and, at the same time, to guard against its inconveniences and dangers.

The instrument consists of two parts. 1st. A straight steel rod eleven inches in length; the distal half of which is cylindrical, and of the size of a No. 1 bougie, terminating in a rounded button of the size of a No. 5 bougie. The proximal half of the rod is a rectangular four-sided bar, whose diagonal corresponds with the diameter of a No. 5 bougie. The proximal end of the rod is furnished with a flat ivory handle, roughened on its sides to enable it to be held more securely. 2d. A silver canula of the size of a No. 10 bougie, and occupying one-half the length of the rod. The distal extremity of the canula is tapered off to the extent of three-quarters of an inch, so as to form a beak, which projects beyond the blades. Immediately behind this beak are two blades which are inserted into grooves on the sides of the canula, so as to be readily taken out and replaced. There are four sets of blades. The largest makes an incision into the neck of the bladder of about one inch and a half in width, and the smallest about three-quarters of an inch. The proximal extremity of the canula has a small ivory handle adapted to it, by means of which the canula is made to stick upon the rod. The end of the canula next to the handle is provided with a square mortice hole, by which it moves upon the rectangular bar.

The manner of operating with this instrument is as follows. The patient being placed and secured in the usual position, a grooved staff is passed through the urethra into the bladder and held firmly in its position by an assistant. A crescentic incision is then made through the perineum with its concavity towards the anus. The incision crosses the *raphé* of the perineum about an inch in front of the anus, its horns extending each side, midway between the anus and the tuberosities of the ischia. A free incision is now made into the membranous part of the urethra along the groove of the staff. The button at the extremity of the steel rod is then passed into the bladder, and the staff withdrawn. The surgeon then holds the handle of the rod with the thumb and index finger of the left hand, and the handle of the canula with the corresponding thumb and finger of the right hand. The canula is then pushed forward until the blades with which it is armed have penetrated the prostate, and the sense of the resistance has ceased, indicating that the blades have entered the cavity of the bladder; the canula is now retracted and then the whole instrument is withdrawn. Nothing remains but to introduce the forceps, seize and extract the stone.

"More than twenty years have elapsed," Dr. P. remarks, "since I introduced this instrument, and I have had occasion to employ it in a considerable number of cases. Experience has confirmed my opinion of its usefulness, and I have no hesitation in commending it to the profession as a means of diminishing the dangers of a formidable operation."

By the same gentleman a description is given of an original Instrument to Facilitate the Introduction of Insect Pins in Wounds of the Face and of other parts, where it is important to secure an accurate adaptation of the edges of the wound. The instrument consists of a needle two and a half inches long; its diameter corresponding with that of a very large darning needle, slightly curved to the extent of a quarter of an inch from its point, and having at its proximal extremity a small flat handle. The curved portion of the needle is flattened, and has cutting edges. Throughout the greater part of its length on the side corresponding with the convexity of the curve there is a groove. In using the instrument, the needle is passed through the edges of the wound in the position to be occupied by the pin, which latter is then slipped along the groove on the needle. By this means the most slender pin may be passed through the skin with perfect facility and without being bent out of shape. The needle being withdrawn the pin is secured by a thread wound upon it in the form of a figure eight, and its point is then removed by means of a cutting pliers.

The next report is from the Committee on Diphtheria as it has Occurred in the United States, by Dr. H. D. Holton, of Vermont. This report presents a very good history, though by no means a complete one, of the prevalence of diphtheria in different parts of this country. The remarks of its author on the pathology of the disease and his description of its most usual symptoms, march, and sequelæ, and his directions for its treatment, are in the main correct. We should differ from him, it is true, as to the contagious nature of diphtheria, and upon some other points of less importance. We would suggest to Dr. H. that there is too close an affinity between denuded cutaneous tissue and mucous tissue, to render the liability of the latter to diphtheritic deposition any argument to prove that those have fallen into error who believe that diphtheria is "a peculiar inflammation of the mucous membrane," into which always the membraniform exudation takes place.

The conclusions to which the reporter has arrived are thus summed up:—

"1. That diphtheria has occurred as an epidemic, from time to time, from the first settlement of this country. 2. That it is a distinct disease, and is not to be confounded with scarlatina or croup. 3. That it is particularly a disease of childhood, although it exempts no age. 4. That it is communicable to that degree that it is the duty of every physician to separate the infected from such as are well, particularly children. 5. That it is a disease primarily affecting the blood, consequently the treatment, to be effective, must be not local but general, and of such a nature as to eradicate or neutralize the poison. Such local treatment should, however, be used as will prevent the absorption of the fluid portions of the exudation. 6. That when the exudation has invaded the trachea, the only hope of saving the patient is in tracheotomy."

The report which follows On Spotted Fever, so called, by Dr. J. J. Levick, of Philadelphia, is one of the ablest and most complete of any comprised in the present volume of *Transactions*. The views of the author of the report in respect to the pathology of the disease and its relationship to cerebro-spinal meningitis seem to us to be borne out by all the facts that have been reported by different observers, from an early period in the present century, and of various and different localities. We prefer not to enter upon an analysis of Dr. L.'s report on the present occasion, as in an early number of the *Journal* we expect that this subject will be more fully discussed than it is possible for us to do on this occasion.

A paper is presented by Dr. A. Mason, of Massachusetts, on The Use of Aluminum as a Base for Artificial Teeth, as a Substitute for Gold and other Metals, and Red Vulcanite. It is a valuable contribution to mechanical dentistry.

A very sensible and suggestive report on The Etiological and Pathological Relations of Epidemic Erysipelas, Spotted Fever, and Diphtheria, was presented by Dr. N. S. Davis, of Chicago. When examined by a more extended series of observations than we at present possess, we have no doubt that the views shadowed forth in the present report will be found correct, and that the inquiry carefully carried out in respect to other diseases than those enumerated, a close relationship in the nature and causation of a more extended list of epidemic maladies will be found to exist than is now suspected.

A report was presented by Dr. H. R. Storer, of Boston, a delegate from the American Medical Association to the Association of Superintendents of Asylums for the Insane, at its session of 1865-66, and especially instructed to urge upon the latter body "the advantage of a more intimate union with the former, alike for the purposes of science and effectual practice." The delegate failed in the accomplishment of the main object of his mission. The report closes by urging the adoption by the Medical Association of the following resolutions:—

"1. That the Association recommend to the several medical and law schools of the country the establishment of an independent chair of medical jurisprudence, to be filled, if possible, by teachers who have studied both law and medicine. Attendance upon one full course of lectures from whom shall be deemed necessary before the medical degree is conferred.

"2. That while this Association regrets that the Association of Superintendents of American Asylums for the Insane has not yet thought fit to unite itself more closely with the representative body of American physicians, it still is of opinion that such union is for their mutual and reciprocal advantage, and that it ought to be effected without delay."

Dr. B. Haskell presents a comparatively short paper in continuance of the subject discussed by him in a communication read at the session of the

Association for 1865, in respect to the existence of independent sensitive and motor nerves; a doctrine which he has attempted to show is not an absolute truth. To learn fully the character of Dr. H.'s objections to the views of Bell, and the arguments upon which they are based, his entire paper, in connection with the communication formerly presented by him, must be read *in extenso*. *

Health in Country and Cities, is the title of a communication presented by Dr. W. F. Thoms, of New York. It is illustrated by tables showing the death-rates, sickness-rates, etc. etc., in country and cities. The communication of Dr. T. is a very valuable contribution to the department of hygiene. The question of the comparative health of cities and country is a very complex one, requiring for its settlement not only a long series of statistics, but a careful comparison of these statistics, with a long list of questions concerning the sanitary condition of different cities and the different parts of a city, and of the several tracts of country and rural districts from which the statistics are derived, with the extent, condition, character, and pursuits of the inhabitants of each.

The report of the Committee on Medical Literature was presented by Dr. Charles A. Lee, of New York. It is a well written and able paper, presenting a very fair exposition of the present condition and extent of the medical literature of the United States, and of the character and value of our medical periodicals. While he vindicates the general medical literature of our country in the face of the unjust criticisms to which it has been subjected, even in many of the annual reports of the Association; and admits whatever deficiencies it may be justly chargeable with, he still insists that whether we examine the medical literature of this country in reference to value of material or to excellence of style, to all, indeed, that goes to constitute true scientific authorship, our best American writers are about on a par with those who have treated similar subjects in Europe.

"We think," says the reporter, "we may safely say that the time is come when our medical students, as well as practitioners, may rely chiefly on our own writers for the professional instruction and information they need; and it is but an act of simple justice to our native authors to urge their writings upon the attention of physicians, as far better adapted for their wants, and far safer guides in the management of our diseases than any foreign works whatever."

The next report, from the Committee of Medical Ethics, is On Specialities, by Dr. Worthington Hooker, and is a very well written and sensible paper. The reporter takes ground in opposition to the exclusive study and practice of specialties, and his arguments have great force and are well worthy of consideration. Appended to it is a very brief minority report, by Dr. Henry I. Bowditch, in defence of such study and practice.

A very candid report was made by Dr. Charles S. Tripler, from the Committee on Rank in the Medical Department of the Army. The comfort and efficiency of the medical officers of the army and the good of the service generally, call loudly for the recognition of military rank in the members of the medical department of the army; and it is to be hoped that the subject which is now before our National Legislature will be disposed of without delay and in accordance with the wishes of the members of a portion of the military service, second in importance to neither of the others.

A communication on the subject of Patent Rights among Medical Men was presented by Drs. D. Prince and Thomas Antisell, in which is advocated the propriety of medical men securing to themselves by a patent, a profit from the use of any discovery or invention of theirs, whether a

medicine or a surgical instrument or apparatus, and proposes to rescind the rule in our code of ethics in respect to patents, which rule is declared to be "founded upon misconception of the subject of patent laws and rights." The reasoning in the report referred to is specious rather than sound, and would equally sustain the right of the medical man to deal in secret nostrums and to withhold from the profession generally the results of his own experience and observations, however important these may be as aids in the prophylaxis or management of disease.

Dr. Benjamin Lee, of Philadelphia, contributes a paper on *The Correct Principles of Treatment for Angular Curvature of the Spine*, in which is advocated the adoption of means by which the weight of the head may be so far removed from off the spinal column, that even commencing deformity may be arrested and future angulation of the spine guarded against, whilst sufficient time is allowed to conquer if it be possible, and in many it is, any disease of the vertebrae, from which angular curvature may result. We do not subscribe to the employment of the mechanical means suggested by Dr. L. for the prevention and correction of spinal curvature, indiscriminately in all cases of vertebral disease; we admit, however, the general correctness of the principles of treatment which he has laid down.

The volume closes with an *Essay on Digitalin, its Chemical, Physiological, and Therapeutic Action*, by Dr. Samuel R. Percy, of New York. To this essay was awarded the prize of the Association. The essay is a very elaborate one, and gives a very good account of digitalin—a neutral principle obtained from the leaves and seeds of *digitalis*; its chemical history—the process for obtaining it, its physical properties, and chemical tests and reagents; together with an account of its physiological action on inferior animals and on man; its therapeutic value and *modus operandi*.

Digitalin, in its medicinal action, controls and lessens the frequency of the heart's pulsations; in fuller doses it deranges the actions of the heart; in poisonous doses it paralyzes the heart, and causes death by syncope.

"It is a pure sedative, and has no narcotic action. Its depressing action is preceded by no stimulation, and the effects it produces upon the mind when given in large doses, causing dreams and hallucinations, is but a reflex action, a derangement of nervous influence."

In comparing the action of digitalin with other sedatives, we find that, unlike hydrocyanic acid, it does not paralyze the medulla oblongata and leave the heart beating after the brain ceases to act. "It produces no anaesthetic effect upon the nerves of the stomach, like creasote." It does not, like aconite, produce an increased secretion of saliva, or paralysis of the fauces, or anaesthesia of the peripheral nerves. Unlike conium, it produces no paralysis of the motor nerves; nor does it cause, like colchicum, purgation, nor congestion of the kidneys, nor increased secretion of uric acid. Unlike antimony, it does not diminish the amount of fibrin in the blood, and become in large doses tolerant, nor, like ipecacuanha, does it produce any great increased secretion from the stomach and lungs.

"I have not," remarks Dr. P., "been able to verify the diuretic action of digitalin when given in a state of health; when given where cardiac lesion and dropsical effusion are present, it is, as a whole, the best diuretic we possess. The nausea and vomiting that are sometimes seen when digitalin is freely given, is nothing but the derangement of the function of the vagus nerve. I have not seen that it acts as an irritant to the mucous membrane of the stomach or intestines, though Bouchardat mentions this pathological condition, but it must be remembered that he tried the *ascophagus*."

D. F. C.

BIBLIOGRAPHICAL NOTICES.

ART. XVI.—*Reports of American Hospitals for the Insane* :—

1. *Of the Maine Insane Hospital, for the fiscal year 1865-66.*
2. *Of the Vermont Asylum, for the fiscal year 1865-66.*
3. *Of the State Hospital at Taunton, Mass., for the fiscal year 1865-66.*
4. *Of the Pennsylvania State Hospital, for the year 1866.*
5. *Of the Maryland Hospital, for the years 1865 and 1866.*
6. *Of the Asylum of North Carolina, for the fiscal years 1864-65, and 1865-66.*
7. *Of the Central Ohio Asylum, for the fiscal year 1865-66.*
8. *Of the Indiana Hospital, for the fiscal year 1865-66.*
9. *Of the Michigan Asylum, for the fiscal years 1862-63, and 1863-64.*
10. *Of the Wisconsin State Hospital, for the fiscal year 1865-66.*

1. THE new wing added to the *Maine Insane Hospital*, in 1865, was finished, internally, and occupied in 1866. The female department is thus considerably enlarged. According to the report now before us, "every dormitory in the male wards is occupied, and has been for the last four or five years, so that we have been obliged to refuse, for a time, more or less applicants every year. We actually need another wing for males more than ever before."

	Men.	Women.	Total.
Patients in the hospital Dec. 1, 1865, . . .	143	134	277
Admitted in the course of the year, . . .	75	60	135
Whole number, . . .	218	194	412
Discharged, including deaths, . . .	85	51	136
Remaining Dec. 31, 1866, . . .	133	143	276
Of those discharged, there were cured, . . .	39	22	61
Died, . . .	18	15	33

Died of consumption, 10; diarrhœa, 5; old age, 4; congestion of the brain, 3; paresis, 3; epilepsy, 4; exhaustive mania, 1; dropsy, 1; suicide, 2.

"Every year we spend with those of minds diseased," remarks Dr. Harlow, "leads us more fully to the conviction that greater care and watchfulness over the physical part of our nature would lessen surprisingly the number who annually fall victims to this worst of human ills. The rules of hygiene are so woefully neglected and disregarded by all classes and in all conditions of men, that it is no marvel to see the vast number of wrecks afloat on all sides.

"The conventionalities of society are but stepping-stones over which the young scramble to find themselves too soon in some institution for the insane, or at the brink of an early grave."

A large part of the report is occupied by an essay upon suicide, which contains nothing of particular importance that is new.

2. The report of Dr. ROCKWELL, of the *Vermont Asylum*, for the official year ending July 31, 1866, is, like all its predecessors, very short. We take from it a few extracts :—

	Men.	Women.	Total.
Patients at the beginning of the year, . . .	241	239	480
Admitted in the course of the year, . . .	77	84	161
Whole number, . . .	318	323	641
Discharged, including deaths, . . .	77	71	148
Remaining at the end of the year, . . .	241	252	493
Of those discharged, there were cured, . . .	.	.	58
Died, . . .	.	.	43

"The comfort and welfare of the patients are greatly affected by the character of those under whom they are immediately placed. If the attendants are of a benevolent and obliging disposition, industrious in their habits, mild, yet decisive in their manners, and possessing a favourable and pleasant tact to perform their several duties, they will greatly relieve the labours of the physician, and promote the recovery of the patients. Those who are mild, amiable, and courteous, will impart the same feelings to those around them; while those who are morose and irritable will create a gloomy and unpleasant atmosphere to all with whom they come in contact.

"One of the most important means for the restoration of the insane is to inspire them with self-respect and self-control. The kindness, tact, and skill for the accomplishment of this, is a great desideratum in the moral management of the insane. Reading and writing are considered valuable auxiliaries for the comfort and restoration of the insane. The patients are furnished with stationery, and are encouraged to write on all subjects except that of their insanity. The practice of writing improves the power of fixing the attention, and tends to restore the lost balance by diverting the mind from its delusions, and calling into exercise those faculties that would otherwise lie dormant. Even when they write on the subject of their delusions, they disclose the nature of their insanity more clearly than could be learned in any other way."

3. The medical history of the *State Lunatic Hospital* at Taunton, Mass., for the official year ending with the 30th of September, 1866, furnishes the following numerical results:—

	Men.	Women.	Total.
Patients in hospital Sept. 30, 1865,	165	178	343
Admitted in course of the year,	109	99	208
Whole number,	274	277	551
Discharged, including deaths,	111	99	210
Remaining, Sept. 30, 1866,	163	178	341
Of those discharged, there were cured,	39	39	78
Died,	23	17	40

Causes of death.—General paralysis, 8; maniacal exhaustion, 6; apoplexy, 5; phthisis, 3; old age, 3; diarrhoea, 2; marasmus, 2; epilepsy, 2; inanition, 2; paralysis, dysentery, disease of the heart, disease of liver, suicide, and cancer, 1 each.

Dr. CHOATE writes as follows in relation to the liability to recurrence of insanity, in cases once restored: "While it is true that its occurrence once in an individual indicates, in many cases, a constitution which makes him more liable in the future than one who has never been attacked—and while there are a few who, though apparently perfectly rational after the termination of their disorder, are incapable of returning to the sphere which they formerly occupied, or of performing the duties which they previously fulfilled, yet the large majority of those recovered continue well, and are as perfect and capable, in all respects, as before their disease. To show how small is the probability of recurrence, and how much the danger of it has been overrated, I have compiled from our records the following statement of the number of times each patient has been admitted:—

2488	patients have been admitted	<i>once,</i>	. . . . .	2488
86	"	"	<i>twice,</i>	172
35	"	"	<i>three times,</i>	105
13	"	"	<i>four</i>	52
3	"	"	<i>five</i>	15
2	"	"	<i>six</i>	12
1	"	"	<i>eight</i>	8
<hr/> 2628 persons,				<hr/> admissions, 2852

"It is not pretended that this statement shows accurately the number of relapses; but it must be remembered that it includes many who are removed

by friends before recovery, and were necessarily returned. On the whole it seems probable that it puts fully as unfavourable an aspect upon the security of the restored insane as the facts would warrant."

The Doctor thus gives his views of the effect of the late war in the production of insanity :—

"At the commencement of the late rebellion, contrary to common expectation, there was an immediate and general check to the numbers thronging to all public institutions, and to insane hospitals among the rest. This continued throughout the war; but with its cessation there has been here, and probably at other similar institutions, an immediate though gradual increase. A few, but not many patients, have been admitted, in whom the mental disease might fairly be attributed to their connection with the great contest. Eleven of those admitted during the year had served in the armies of the Republic. On the whole, it seems probable that the general effect of the national trial has been healthful to the public mind, and that although some new causes of mental disease have been introduced, yet the percentage of insanity has been slightly reduced."

4. At the *Pennsylvania State Hospital*, during the year 1866, the number of patients constantly exceeded the limit which was originally fixed for the building. As a remedy for this tendency to overcrowding, Dr. Curwen very wisely recommends the erection of another hospital, instead of enlarging this to unwieldy dimensions. His reasons for this course are thus stated :—

"The opinions of the ablest and most experienced gentlemen, who have devoted most time to the study of mental disorders, are most decidedly opposed to the erection of hospitals to accommodate a larger number than this is calculated to receive. No man, no matter how great his ability, can give proper, careful, and thorough attention to a larger number, and also perform, as he should, all the other duties which require his personal care. To secure the best results, the superintending physician must personally study the different cases, and make himself familiar with them; and to do this, maintain the proper discipline of the establishment, and faithfully discharge all the duties assigned him, will fully tax the energies and resources of the best man; and every additional patient only detracts so much from his ability rightly to discharge his duties; and in justice to himself and to those intrusted to his care, these duties cannot be delegated to others. He should see with his own eyes and hear with his own ears, that thus he may take advantage of everything which may most tend to benefit those intrusted to his care."

He advises, however, that a room for an infirmary be erected in connection with each ward of the present hospital. This is an excellent proposition, and the proposed rooms would be a great improvement.

On the supposition that a new hospital shall be erected, the Doctor gives the following injunctions, a due regard to which would be the part of a wise economy. In the hospitals of the United States, hundreds of thousands of dollars have been expended in correcting the errors and supplying the deficiencies of ignorant architects and master-builders :—

"The edifice itself should be constructed in the most careful manner, in strict accordance with the requirements of the class to be accommodated, and in the light of the ample knowledge obtained on this subject within the last ten or fifteen years, under the direct superintendence of a well qualified medical man, who has had previous experience in a hospital for the insane, and who may be able to conduct it after it is ready for occupation. In this way much expense may be saved in the construction and arrangement of matters of vital importance to the proper management of the hospital, but which cannot be known to an architect or builder, who has had no opportunity of giving special attention to such matters. Every one desiring to have any work done in the best manner, will select for it the most careful and competent workman he can find; and so in this matter of hospital building, the man best acquainted with the requirements of a hospital for the insane, should prepare the plans, direct its erection, and be responsible for the proper arrangement of all its parts."

	Men.	Women.	Total.
Patients in hospital Jan. 1, 1866,	157	149	306
Admitted in course of the year,	115	72	187
Whole number,	272	221	493
Discharged, including deaths,	91	75	166
Remaining Dec. 31, 1866,	181	146	327
Of those discharged, there were cured, .	26	21	47
Died,	14	19	33

Causes of death.—Exhaustion of acute mania, 9; exhaustion of chronic mania, 13; suicide, 1; congestion of the lungs, 2; phthisis pulmonalis, 2; disease of the heart, 2; asphyxia, 1; disease of the brain, inducing paralysis, 3.

5. The general statistics of the *Maryland Hospital*, for the years 1865 and 1866, are as follows:—

	Men.	Women.	Total.
In hospital Jan. 1, 1865,	63	57	120
Admitted in 1865, including 65 cases of mania-a-potu, .	108	25	133
Admitted in 1866, including 51 cases of mania-a-potu, .	94	27	121
Whole number in the two years,	265	109	374
Discharged, including deaths, in 1865,	102	29	131
Discharged, including deaths, in 1866,	102	40	142
Whole number discharged,	204	69	273
Remaining Dec. 31, 1866,	61	40	101
Cured in 1865, including 59 of mania-a-potu, . .	76	11	86
Cured in 1866, including 52 of mania-a-potu, . .	67	10	77
Died in 1865, including 2 men with mania-a-potu, .	9	2	11
Died in 1866, including 1 case of mania-a-potu, . .	6	3	9

"There has not been," says Dr. FORDERSEN, "at any time in the last twenty years, a prevalent febrile, contagious, or inflammatory disease in the hospital. The physical health of the older inmates in the last two years, excepting those with whom it was broken down when they were admitted, or became so after a slow process of deterioration in the vital functions, has been, in general, good.

"The same course of moral, medicinal, and hygienic management which has been heretofore pursued, with the addition of such advantages as longer experience has contributed, remains in daily operation; and a continued supervision is exercised over the details in the proceedings of the household, to promote its welfare, mentally and physically.

"Among the improvements which have of late years been made, none has surpassed in value the introduction of the new heating apparatus by means of the circulation of hot water in pipes, permanently arranged throughout the main building."

6. The general numerical results at the *Insane Asylum of North Carolina*, for the two official years, the latter of which ended with the end of October, 1866, are as follows:—

	Men.	Women.	Total.
Patients in hospital, Nov. 1, 1864,	96	84	180
Admitted in two years,	61	46	107
Whole number,	157	130	287
Discharged, including deaths,	75	46	121
Remaining, Nov. 1, 1866,	82	83 ¹	165
Of those discharged, there were cured, . .	15	7	22
Died,	32	27	59

Of the patients admitted, the mental disease of one is attributed to the "John Brown raid," and of seventeen to "the war."

"Of the admissions during the year, eleven were of ten years' duration;

¹ As in the report.

seventeen were of five years' duration; nine were of two years' duration; eight were of one year's duration; five unknown: fifteen were of less than one year—making a total of fifty whose ascertained and unknown duration is more than one year. Seventy-four per cent. of chronic cases of total admissions, from which it appears that the Institution continues to be, as it always has been, the recipient of a large number of unfavourable cases, and of persons whose physical systems and energies have become greatly enervated, if not materially exhausted, by mental and bodily ailments.

"A reply to the inquiry why such a large number of chronic cases were sent to the Institution in the past year, may be found partly in the impoverished condition of the families to which many of them belong, and who find themselves unable to take farther care of them, and partly in others having overcome a groundless prejudice against such Institutions, as well as a false sense of apprehended disgrace on the part of relatives and friends, from placing their unfortunate ones in institutions of the kind.

"Since it has been made known to the authorities of the Freedmen's Bureau of a readiness on the part of the Board of Supervisors to admit coloured insane into the Institution, a number of applications for patients of that class have been made, but which have been rejected for the want of apartments."

Dr. Fisher's report is mostly devoted to the material and financial interests of the hospital.

7. Very extensive repairs and improvements of the buildings of the *Central Ohio Lunatic Asylum* were made in the course of the official year ending with the 31st of October, 1866. An "Infirmary for infectious diseases—a plain, substantial brick building, conveniently arranged for both sexes, and well ventilated, is rapidly approaching completion."

	Men.	Women.	Total.
Patients in hospital Nov. 1, 1865,	134	145	279
Admitted in course of the year,	82	105	187
Whole number,	216	250	466
Discharged, including deaths,	79	87	166
Remaining Nov. 1, 1866,	137	163	300
Of those discharged, there were cured,	51	58	109
Died,	9	11	20

Causes of death.—Acute maniacal exhaustion, 8; exhaustion and general decay, 3; organic lesions of the brain, 2; marasmus, 2; consumption, inflammation of the lungs, inanition, dropsy, and peritonitis, 1 each.

"We have had no epidemic influence with which to contend, and hence the moderate list of the deceased."

The large proportion of cures is accounted for by the fact, that in the admission of patients, preference is given to recent cases.

"Of the many new remedies," says Dr. Peck, "that are attracting attention at the present time, I can speak favourably of the following: The tincture of digitalis is a valuable medicine in the treatment of paroxysmal insanity, attended with a high degree of excitement. It has been used quite extensively during the past year in this Institution, with very decided and satisfactory results, and not a single *unpleasant symptom* has occurred from its use in any case. The dose we vary from twenty drops to two drachms of the officinal tincture. My experience in the use of this remedy leads me to state that, to obtain desirable results, it should be given in rather large doses.

"Another remedy of value I find in the bromide of potassium. It is indicated in nervous disorder, accompanied with spasmodic phenomena. Its use in this Asylum is becoming more and more extended daily; but the class of patients for whom it seems of the most uniform value is the young of both sexes, whose mental alienation has been caused by disorder of the organs or generation.

"The permanganate of potassa is a medicine of considerable value in the treatment of gastric disorder. Cases of melancholia are very frequently attended

with troublesome dyspeptic symptoms. In cases of this kind this remedy is usually of real service."

The tincture of digitalis can hardly be called a "new remedy" in the treatment of insanity. Twenty-five years ago there was, perhaps, no one medicine which was more extensively used in the hospital for the insane with which we were at that time connected, than this same tincture.

8. At the *Indiana Hospital for the Insane*, for the last ten years, the demand for accommodations has far exceeded the supply. In the course of the official year ending October 31, 1866, the number of rejected applicants was seventy-eight. There is now some prospect that the building will be enlarged.

	Men.	Women.	Total.
Patients in hospital Oct. 31, 1865,	127	135	262
Admitted in course of the year	133	108	241
Whole number,	260	243	503
Discharged, including deaths,	127	103	230
Remaining Oct. 31, 1866,	133	140	273
Of the discharged, there were cured,	69	54	123
Died,	15	9	24

Causes of death.—Exhaustion from acute mania, 10; exhaustion from chronic mania, 3; puerperal mania, 1; marasmus, 5; general paralysis, 2; convulsions, 2; suicide, by strangulation, 1.

The hospital is so far from being adequate to the treatment of all the patients for whom admission is requested, that, during the past year, all chronic cases were rejected, and recent ones alone received. Hence the number of curables was largely augmented, and, as a natural consequence, the percentage of cures very considerably increased beyond that of the general average of hospitals for the insane.

"The ill-health," says Dr. LOCKHART, "so often recorded on admitting patients to the hospital, is too often continuous. Indigestion and anæmia, with our insane, are general, if not quite universal. Hereditary and climatic (malarious) influences; ignorance of, or disregard for the laws of health—as the use of improper food, or the abuse of articles in themselves wholesome; excessive toil, or the want of exercise; intemperance, with its long catalogue of ills, physical, moral, mental; and *loss of sleep*, whether from domestic affliction or discord; a restless desire for gain, or the multitudinous excesses and indulgences of the young and the vicious, seeking for pleasure where it never has been found; or from whatever other cause 'nature's sweet restorer, balmy sleep,' is wanting—these all play their part in making up the sum total of diseased bodies and diseased brains. No cases, however, are so lamentable as those of the young, who have exhausted body and mind in rounds of senseless pleasure—the late, highly seasoned, needful suppers—the convivial glass, the white-heat of excitement at the play and the gaming-table; the midnight revel; the feverish, salacious dreams, and yet more salacious indulgences, until at last life is exhausted, and the miserable wretch lingers for a few months in an asylum, *demented*, and death closes the scene."

9. By the report of the *Michigan Asylum for the Insane*, for the two official years next preceding the 1st of December, 1864, it appears that in the course of those two years the central edifice of that Institution was completed and occupied.

	Men.	Women.	Total.
Patients in hospital Nov. 30, 1862,	58	97	155
Admitted in the course of two years,	72	73	145
Whole number,	130	170	300
Discharged, including deaths,	55	81	136
Remaining Nov. 30, 1864,	75	89	164
Of those discharged, there were cured,	28	30	58
Died,	5	11	16

Dr. VAN DEUSEN, in this report, exhibits, in various ways, the importance of completing the building according to its original design, in order to meet the wants of the people of the State. In respect to moral treatment, he says:—

“In addition to the means previously in use for the physical and mental recreation and diversion of our household, there has been added, since the issue of our last report, a valuable stereoscopton, with an oxyhydrogen light, manufactured by Queen & Co., of Philadelphia, and a large collection of choice slides. This apparatus will continue to furnish, at a small additional yearly expense, a source of most elegant and refined entertainment. One exhibition, of two hours' length, was attended by nearly all the patients from one of the most disturbed wards; and a quieter, or more pleased attendance could not have been secured anywhere.

“We have also provided for each of the convalescent halls, *pigeon-hole boards*, which have been in such constant use, and have afforded so much pleasure, that we shall endeavour to introduce them elsewhere.

“A very pleasant incident in the history of the past year was a reunion of recovered patients, during the holidays. Nearly every available space in the house being already occupied, the number of invitations extended was necessarily very limited, but the occasion was one long to be remembered.”

10. At the *Wisconsin State Hospital for the Insane*, as appears by the report of that Institution for the year ending September 30, 1866, an enlargement of the building is in progress, by which the accommodations for patients will be doubled.

	Men.	Women.	Total.
Patients at the beginning of the year,	89	88	177
Admitted in the course of the year,	57	38	95
Whole number,	146	126	272
Discharged, including deaths,	50	42	92
Remaining at the end of the year,	96	84	180
Of those discharged, there were cured,			42
Died,			7

Deaths from exhaustion, 4; diabetes, 1; general paralysis, 2.

Dr. VAN NORSTRAND thus presents his views in regard to manual labour, as adapted to the treatment of the insane:—

“A patient under recent excitement should not labour, but when convalescence has commenced, if in tolerable physical condition, he should commence light labour, and gradually increase it to a moderate amount, always considering his physical condition. All chronic cases, if not physically disabled, are improved by out-door exercise or labour—appetite and sleep are better; they are more manageable and docile, less filthy in their habits, much more agreeable generally, always improving physically, and many times mentally, to a certain extent. The labour should be agricultural, the simpler the better, and not exhaustive. Mechanical shop-labour I should rather avoid; the patient is more excluded from fresh air, the life-giving influence of sunlight—is more exhaustive to the mental energies, has more opportunity to injure himself or others with tools, and may secrete them in his clothes, and allow other patients who are suicidal or homicidal to use them. For these reasons, together with the fact that an insane man learns a new pursuit with much difficulty, I have been inclined to provide all the patients, who felt disposed to labour, with agricultural or horticultural employment, unless they manifested much aptitude for some other pursuit. Females, of course, have not worked out of doors, except in the flower-garden, their labour being done mostly in the sewing-room, wards, dining-rooms, kitchen, laundry, ironing-rooms, &c.”

It appears that the farm is made a valuable appendage to this hospital.

P. E.

ART. XVII.—*Guy's Hospital Reports*. Edited by C. HILTON FAGGE, M. D., and ARTHUR E. DURHAM. Third series, vol. xii. London: John Churchill & Sons, 1866. 8vo. pp. 683.

THE present volume of this valuable publication contains twenty-five original contributions, eleven plates and a number of wood-cuts. As has been our practice, we shall lay before our readers a full analysis of its contents:—

I. *On Hydrophobia*. By J. COOPER FORSTER.

In this paper the histories of seven cases of hydrophobia are related which, with six cases mentioned by Dr. Bright in his work entitled *Medical Reports*, as having been admitted into Guy's Hospital in the decade from 1820 to 1830, lead to some interesting observations concerning this strange disease.

The first point is the question, How long after the bite may hydrophobia occur? In the thirteen cases, the shortest time that elapsed was four weeks, and the longest—in one case only—five to seven years; the other eleven all took place at various periods within eleven months. Here we have the results of a poison apparently more tardy in its action than any other to the action of which the human body is subject. Moreover, when the disease appeared early, the bitten part was situated in the most vascular and sensitive region of the body, where the circulation is most active, and where absorption might naturally be expected to take place most rapidly. When clothing has intervened, a long time, even some years, may elapse before the disease occurs.

Some may be disposed to think that when hydrophobia appears several years after the occurrence of a bite, it can scarcely be considered to be owing to the wound then inflicted. The only solution of the difficulty is that hydrophobia may occur spontaneously, which Mr. Forster cannot adopt.

By some writers a change is said to occur in the original wound previous to the appearance of the hydrophobic symptoms. Indeed, in the article on Hydrophobia by Messrs. Gamgee, in Reynolds's *System of Medicine*, the wound is said to "become intensely painful." "If the wound have cicatrized, the cicatrix becomes red and irritable; or if, as is generally the case when the injuries inflicted by the rabid animal have been severe, it has not healed, it assumes an unhealthy appearance." In none of the cases detailed by Mr. Forster was there the slightest alteration in the wounds. In those of Dr. Bright it is stated, in one case, "that the scar of the bite was evidently inflamed."

That there has sometimes been great pain in the course of the nerves leading from the injured part there is no doubt. Indeed, this appears to be one of the most marked symptoms of the onset of the disease, and one which first attracts attention. This pain is along the course of the nerves, and not along the track of the absorbents, as there is no enlargement of the glands or lymphatics at all indicative of any irritation.

The characteristic difficulty in swallowing is not a dread of fluid, but an inability to perform the act of swallowing when the liquid is taken into the mouth. In all the cases the patient took the glass, or mug, or spoon, and earnestly wished to swallow the liquid, but found it impossible, apparently owing to an irregular contraction of the muscles of the pharynx. It is Mr. Forster's belief that this peculiar inability to swallow, and the excessive pain leading from the wound are symptoms sufficient to characterize hydrophobia without any other.

Upon a careful examination of all the post-mortem appearances related, there seems to be no special organ that claims particular attention. An enlarged condition of the pharynx, which is now generally admitted to be dilated in this disease, is noticed, but whether this condition is cause or effect appears very difficult to decide.

As regards the treatment of hydrophobia, there is nothing in these cases to afford a shadow of encouragement to hope for success from any known means whatever. Excision of the bitten parts, which some consider as a tolerably certain means of preventing hydrophobia, Mr. Forster pronounces to be vain. In the only case he reports where it was practised, the disease appeared in four

weeks. "Excision or non-excision is alike in vain; sooner or later the disease appears!" Nothing, so far as we know at present, can prevent it.

II. *The Teeth, as Passive Organs of Speech.* By S. JAMES A. SALTER, M. B., F. R. S.

Articular sounds are essentially produced by the passage of air through the oral canal. By the soft palate, the front teeth and the gums just behind them, and the lips, certain characters are impressed upon the air passing through them. In this paper is considered the effect produced upon the air by the teeth. The principal way in which the teeth assist in the production of articular sounds is by acting as an arch, or horseshoe-shaped ridge, within which and against which the tongue may act as a valve, and by pressing against which it may produce modified and variously placed partial or complete closure. Mr. Salter analyzes particularly and in order the way in which all the dental sounds are formed. Now the loss or injury of any of the passive organs of speech produces a corresponding defect in the articulation of the sufferer; and if the teeth are the organs effected, then the dental sounds are interrupted or interfered with. This is always most manifest immediately after the loss has taken place, for by degrees this loss is compensated for, to a certain extent, by the adaptation of the soft parts, and the cultivated skill of the speaker.

III. *On the Application of Physiological Tests for Certain Organic Poisons, and especially Digitaline.* By C. HILTON FAGGE, M. D., and THOMAS STEVENSON, M. D.

In this long paper are furnished the details of a number of experimental investigations made for the purpose of determining whether digitaline can, with certainty, be detected by its effects upon the lower animals, but the conclusions, to our minds at least, are by no means very satisfactory.

IV. *Observations on the Pathology of some of the Diseases of the Nervous System.* By SAMUEL WILKS, M. D.

The object of this paper is to endeavour to find some scientific basis for a classification of nervous diseases, so that the organic affections, at least, might be arranged on a definite principle. A physiological method of classification of cerebral affections is certainly better than one strictly pathological, but the discovery of the connection between particular symptoms and definite nervous lesions is of the utmost importance in a clinical sense, and of the extremest interest from a physiological point of view. It must be theoretically true that alterations in particular parts of the nervous structures are attended by definite and certain symptoms; and, practically, it must be equally true, could such lesions exist as results of disease, corresponding phenomena must occur.

The physiological study of nervous disease is a new pursuit; in our textbooks we find scarcely an attempt to place nervous diseases on a scientific basis, and in no direction is more to be discovered and more to be gained. Our knowledge of the physiology of the nervous system has depended in part upon experiments upon animals, in part upon the experiments made for us in the human body by disease. Among the experiments which have afforded the best results have been those on the spinal cord and the nerves; as regards the brain, the results obtained by the study of diseased states are more reliable than those derived from vivisection or direct experiment.

In this paper is given the connections that exist between particular affections and diseased states of the nerve centres. The whole number of original cases given by Dr. Wilks is seventy-nine. Some generally correct conclusions, at least, to the best of our judgment, are arrived at, and a method of framing a scientific classification of nervous diseases is approached.

The spinal cord and the two large ganglia at its summit, in the brain, contain the working power of the body; while the cerebral hemispheres have the power of control, and are also the seat of the intellectual operations and of the consciousness and will. The whole working of the machinery of the body, unless under morbid conditions, is performed without the exercise of will or feeling on our part, and in all probability it is true also that processes of intellect may be carried on in the cerebral hemispheres without our direct knowledge

or consciousness. There is every reason to believe that sensory impressions may be conveyed beyond the ganglia at the summit of the cord to the cerebral hemispheres, and then setting in active operation that wonderful machinery, may produce purely mental results without any necessary consciousness on the part of the individual. The Cartesian philosophy teaches that physiology is limited to the domain of consciousness, that the mind always thinks, that being and knowing are the same, and that even during sleep and stupor consciousness exists. Such doctrines are completely overturned, and so far from consciousness being the basis of all intellectual operations, it might, in some cases, be the result of them.

During sleep, when entirely unconscious, the mind works. Study a question in the evening, and you often find it solved in the morning. Laplace, the illustrious mathematician, tells us, in one of his works, that frequently he thought over a problem before retiring to rest, and found it solved in his mind on awakening. The school boy looks over his lesson in the evening, puts the book under his pillow, and knows the lesson in the morning. The idea is deposited in the brain, as a crystal is formed when the mother-water, after agitation, is allowed to rest. A just and scientific view of this interesting piece of philosophy is of great assistance in the understanding of many phases of animal and organic life.

Soon after the discovery of the double nature of nerves, it was surmised that the motor nerves pass up the front of the spinal cord, and the sensory along its back. Observations in cases of disease and injury soon showed such opinions to be erroneous, and their results have been corroborated by recent experiments made by Brown-Séquard, which prove that the motor tract is chiefly in the antero-lateral columns, and that the sensory fibres pass more especially along the centre of the cord, first crossing to the opposite side soon after they enter it, and that even the gray substance conveys sensory impressions. Besides containing these strands of fibres for sensation and motion, the spinal cord possesses a property of its own, known as the *eccito-motor* function, by which a stimulus conveyed by a nerve to the cord excites a corresponding motion without the animal taking cognizance of it, or having any voluntary share in its taking place. Passing along the cord, the motor tracts pass to the opposite sides at the medulla oblongata, and then proceed in part to the cerebellum and in part to the pons Varolii. Those to the pons Varolii pass through the crura cerebri to the thalami optici, and the corpora striata. The physiologist traces them through the lower part of the pons, and the crura cerebri, and then along the lower border of the thalami to end in the corpora striata. The sensory fibres pass up in like manner to spread only in the thalami optici. It has also been shown, both by physiological and pathological observations, that in passing up from the medulla to the ganglia above, the motor tract contains more especially the fibres from the extremities, and that the nerves to the chest and those which are styled cranial nerves have distinct centres of power of their own.

The will has its seat in the cineritious structure of the brain, and influences the ganglia below by means of the white fibres of the medullary matter. It has not yet been positively determined whether any of the nerve fibres from the cord pass directly to the cerebral hemispheres, or whether they all terminate in the cerebral ganglia, the further communication between these ganglia and the hemispheres being in this case effected by independent fibres. The influence conveyed by the will differs altogether from that imparted by a nerve from the ganglia. In hysteria, when the influence of the nerve-centres is good, but the will is wanting, the natural character and plumpness of the limbs are preserved; in paralysis, from injury or disease of the ganglia, the limb is withered. It has been positively ascertained that the will can act upon the limbs only through the corpora striata and thalami; but it is yet uncertain whether it can act, when these are destroyed, through the nerve centres of the pneumogastric and other cranial nerves, upon the muscles of the face and chest. Anatomists would make fibres pass from the pons to the surface of the brain without touching the cerebral ganglia, and it might seem from some observations in

diseased persons, that the will could act irrespective of the intervention of the ganglia.

The large vascular supply to the corpora striata and thalami is probably the reason why hemiplegia, that is, paralysis of the arm and leg only, with a partial affection of some of the muscles of the face—is one of the commonest forms of paralysis. The loss of speech in right hemiplegia is so remarkable a circumstance, and one that has of recent years excited so much interest, that we will cite entire the whole passage in this article relative to this affection :—

“With regard to the loss of speech in right hemiplegia, I need scarcely say that my observations accord entirely with those of Dr. Hughlings Jackson, although the true explanation of this remarkable circumstance has yet to be discovered. It cannot be believed that the organ of speech is originally situated on one side of the brain only, and thus the explanation must be sought in some secondary cause. My colleague Dr Moxon has offered a very good theory, which probably has much truth in it; it is to the effect that of the two halves of which the body is made up one is more especially educated, and that the other follows the movement by consent. This phenomenon, which appears so remarkable, is probably merely one instance of a general law of our bodies which has been hitherto overlooked; so far from being exceptional, I believe it to be only one example amongst numerous others, which shows how partial is the education of our muscles. In the case of writing the fact is so evident that we have never thought of its importance in reference to the physiology of the brain; as most persons write with their right hand, a hemiplegia on this side deprives them of the power to write, whereas a similar affection of the left side has no such effect. Now, when we consider that the mechanism by which writing is performed is entirely the product of education, and that the various movements are guided by nerves which are themselves under the influence of the brain, it becomes evident that one side of the brain only obtains the guiding power. Hence, were it possible for the halves of the brain to be changed over, so that the limb should retain its activity, the power to write would, I take it, still be wanting. It might, of course, be acquired, and thus our hemiplegic patients again learn to talk as they did in infancy. It is probable that for those operations in which we can use both sides of the body equally both sides of the brain have been educated alike; but since in many acts one side rather than the other has been put into use, it has followed that one half of the brain has been specially educated. As regards the movements of the limbs, this is self-evident, but it now seems to be equally true of the power of speech, and it may be true, likewise, of many other operations, as, for example, musical performances. So, again, with reference to the eye: I have heard of a man who was in the habit of using a theodolite with the right eye, and who could not employ the left for this purpose, although the sight was equally good.

“There seem to be different degrees of loss of speech. Thus, in some cases there is a mere inability to articulate, whilst the patient is able to write; in others, a loss of memory of words until they are suggested; and in yet others a total forgetfulness of names, the patient giving everything a wrong appellation. It would be important to know whether these different symptoms are associated with distinct lesions; at present it is thought that loss of speech is associated especially with some disease in that part of the brain known as the island of Reil; and yet, at the same time, it is said that the loss of speech is nearly always connected with a hemiplegia. It follows, therefore, that, unless disease in the spot just named is sufficient to produce a hemiplegia, there must be an affection of the centres, extending towards the external parts.

“In all the cases which I have myself seen, and, if I remember rightly, in those which have been recorded by others, there has been disease in the central ganglia, and I take it that this is necessary for the production of a hemiplegia. But the question remains, is it necessary that disease should advance beyond these parts in order to cause the loss of speech? According to the theory of the education of the one side to the disparagement of the other, a simple loss of power is all that would be required to produce this symptom; and if, as a matter of fact, loss of speech accompanies all right hemiplegia, then, assuredly, a small spot of disease in the central ganglia is sufficient. It may, indeed, be

thought that a further extension of the mischief onwards to the gray matter of the hemispheres (especially in the region of the island of Reil) is essential to the further loss of all memory of words; and, on that supposition, we should be on the watch for cases in which this part is injured independently of the centres, and in which loss of speech would, perhaps, exist without any corresponding hemiplegia. Cases of loss of speech certainly occur without a paralysis of the limb, but I am not aware that they have been shown to be due to disease in the island of Reil. I have on more than one occasion seen loss of speech with right hemiplegia where the lesion was confined to the centres, but in these cases I believe that the failure of speech proceeded no further than an inability to articulate. Aphonia may also occur from disease in the pons Varolii, and I have thought that, by noting accurately this symptom in cases of disease lower down in the motor tract, we might obtain a proof of the importance of the anterior lobe in the production of speech. For example, a lady had disease in the pons Varolii; her tongue and soft palate were paralyzed, so that she could not utter a word, but she could write down accurately all her wants. On the other hand, I am now seeing a patient who has somewhat similar symptoms, denoting a disease of the pons, and who has loss of speech; but before this was complete, and when she spoke intelligibly enough to make herself understood by her husband, she called things by their wrong names. The cause was clearly not in the brain proper, for the temporary paralysis which she at first had was on the left side.

"If we believe that, for the production of a persistent hemiplegia, some part of the motor tract must be involved—if we find that in nearly all these cases of loss of speech with paralysis of the right side one of the central ganglia is affected—and if we also adopt the theory that this peculiarity is due to the education of one side alone—these facts would imply simply that the muscles of the tongue and palate had never learned to act in a certain definite manner; but whether the memory of words, being independent of the mechanism by which they are formed, requires another locality for its action, is very doubtful. This anatomical and physiological question merges into the old metaphysical one as to how far the idea must correspond with the outward sign. I apprehend that, according to Dr. Jackson's supposition, a disease of the left corpus striatum would necessitate a loss of the power of articulation, and, if it also involved the neighbouring efferent structure, would likewise destroy the faculty of speech; while if the latter were the only function affected it would be surmised that the surface about the island of Reil was alone affected."

As regards the respective functions of the ganglia, though there can scarcely be a doubt that each has its own peculiar office, yet there is no evidence in the experience of Dr. Wilks, to connect the ganglia separately with the motor and sensory tracts. The anatomist, by dissection, shows that the motor tract passes into the corpus striatum, and the sensory into the thalamus. By clinical observation no such distinction in office has as yet been made out.

Disease of the pons Varolii, or medulla oblongata, by affecting special nerves, is productive of a distinctive form of paralysis. In ordinary hemiplegia there is merely a temporary inhibitory influence on the facial nerve centre, while in actual disease of the pons the nerve root may be involved, and thus, with the hemiplegia, there may be a decided facial paralysis on the same side. According to Brown-Séquard, in such a case, the upper part of the pons is affected; while when the lower part is the seat of disease, owing to the decussation of the fibres of the seventh pair in the pons, paralysis of the face occurs on the side opposite to that of the limb. This opinion Dr. Wilks has not been able to make sure of, from his own clinical observations. Disease of the pons may also affect other nerves, as, for instance, the fifth or the sixth. By disease still lower down towards the medulla oblongata, the fibres of the lingual and glossopharyngeal nerves are involved. Three instances of such an affection are given. Of disease confined to the medulla oblongata none are recorded.

Another symptom often observed in disease of the pons is contraction of the pupil, just as we see this produced by effusion of blood at the base of the brain or into the ventricles. This state of the pupils has often led to the suspicion of opium poisoning. In many instances, sensation has been markedly affected,

as evidenced by a feeling of coldness in the extremities; and in one case, in which a tumour pressed on the pons, a sensation of numbness, and various odd feelings over the body were experienced.

The effects of disease of the superficial gray matter of the brain, are shown in the following case, which we cite entire from its rarity as well as its extraordinary interest and importance. The case is comparable with one of paralysis resulting from unilateral arachnitis; but in the latter the inflammation is seldom confined entirely to one side, and it is necessarily accompanied by disturbance of the intellect:—

“CASE 18. *Disease of cineritious surface of the brain; hemiplegia.*—A woman, æt. 36, struck her head against a beam of the ceiling several months before death; she subsequently became ill and had two or three attacks of vomiting. About three months before her death she became very ill, and took to her bed; she had febrile symptoms, sickness, &c., and was evidently suffering from cerebral disturbance. After the urgent symptoms had passed off she lay quiet in bed, and appeared quite sensible of what was said to her. She gradually became weaker in her limbs, and especially in those of the left side, until, in three weeks, her left side was quite paralyzed. After this she lay quiet, apparently sensible, and able, although with difficulty, to answer questions and to put out her tongue. On being asked a question she would wait and deliberate, and then slowly answer. The most remarkable symptom was the fact that she never seemed aware that she had lost the power of the left side. On being asked about her arm she always declared she could move it, although it lay helpless by her side. She gradually got weaker; mucus collected in her bronchial tubes, and thus she died.

“The post-mortem examination showed nearly the whole of the surface of the right hemisphere of the cerebrum to be diseased; it was in a very peculiar condition, as if the whole cineritious substance were undergoing disintegration. This was not so apparent on the surface as on taking off a thin slice, when the cortical part of the brain was seen to be of a yellowish colour, worm-eaten and soft. The disease, in some places, affected the deeper layers more than the external. The disintegration reached the medullary matter, but did not appear to penetrate deeper. This morbid condition extended all over the right hemisphere with the exception of the base. The left hemisphere was quite healthy.”

In disease of the surface, as from compression, consciousness is gone together with the will; in disease of the centres the will is good, but the machinery is inefficient; in this case, one hemisphere remained healthy, and thus consciousness was preserved, the patient could not move the limbs, because the power to stimulate the apparatus was wanting, and yet, though consciousness remained, she did not feel the inability, the limbs receiving their usual nervous influence through the healthy nervous centres.

In the cases of paralysis from compression by blood or pus, the consequence of an injury, there are some highly important facts in the practice of surgery. One is that a partial hemiplegia, occurring soon after an injury, always points to a clot on the opposite side, and the other is that an abscess in the situation in which the clot of blood is thrown out, was never met with, so as to be accessible to an operation. The unconsciousness which comes on in these cases is produced by inflammation of the surface of the brain; and hemiplegia, if present, is either a symptom of arachnitis, or is due to the lesion of the brain having extended into the deeper parts. This theoretical objection to secondary trephining, Dr. Wilks says, is borne only by practice; it has fallen to his lot to examine the bodies of many in whom the operation has been performed, and though he has made repeated inquiries, he has never been shown in the wards of the hospital any cases in which recovery has followed such an operation.

Under the heading of *injury to the central parts of the brain from violence* are some cases of the highest importance in a medico-legal point of view, as they show that even in cases of injury the centre of the brain may occasionally receive all the violence of the shock. Several of the cases here related suggest the consideration that probably many erroneous impressions, as to the cause of particular nervous symptoms, arise from it not being known that disease of the brain may extend to the spine, and *vice versa*. The ventricles of the

brain communicate with the subarachnoid space of the brain and spinal cord, and inflammation of one is constantly associated with a similar affection in the other.

Compression of the brain by depressed bone is a subject which Dr. Wilks does not discuss, not being furnished with well-attested facts that bear upon it.

Diseases implicating the surface of the brain affect the intellectual powers, the will and the consciousness, and produce convulsions. Of this portion of Dr. Wilks' paper we will not attempt to make an abstract. We will state, however, that no symptom is associated with disease of a particular part of the brain more certainly than convulsions with an irritation of the surface. Of epilepsy, Dr. Wilks says, that from clinical and post-mortem observations, as well as from all analogy, we cannot but conclude that the *fons et origo mali* is in the cineritious substance of the brain.

Disease of the medullary substance leads to symptoms, generally, of an altogether negative character. No paralysis ensues; there are no fits, and in many cases there is no pain; there is no disturbance of the intellectual functions, or, if present, it consists merely in a general obscuration of the faculties. Physiologists believe that this substance consists of fibres connecting the surface of the brain with the cerebral ganglia, and there is every reason to believe that this view of its structure is correct.

In Dr. Wilks's cases of disease of the cerebellum, there is nothing to support the general belief of physiologists, which is founded upon experiments made on the lower animals, that its function is to harmonize and co-ordinate the various movements. Nothing more was observed than a desire to lie quiet in bed, and an anxiety to be let alone, and these are common symptoms in other cerebral diseases.

As the fact is, apparently, not so generally known as it should be, we will state, in concluding our abstract of this paper, that instant death is not caused by disease of the brain. In other words, apoplexy is very rarely, if ever, a suddenly fatal disease. Even when blood is effused into the pons Varolii and the neighbourhood of the fourth ventricle, two or three hours elapse before the death of the patient. Among the reports of several thousand post-mortem examinations, Dr. Wilks found only one case in which death was sudden; this was a case of meningeal apoplexy.

V. *Remarks on some of the Functional Diseases of the Nervous System.* By SAMUEL WILKS, M.D.

These remarks are excellent, and the views maintained are of the more weight as coming from one who has devoted much time to pathological pursuits, and might therefore be supposed to be inclined to look for organic disease in all cases of disturbed function. That a nerve centre should act violently, and that it should cease to act, are conditions which occur in health; and we can hardly suppose that modifications of action, constituting morbid states of the nervous system, are necessarily evidence of organic disease. If various irregular movements in the limbs can be produced by voluntary effort, there seems no reason to look for organic change in that centre whence such movements proceed when they are altogether involuntary.

VI. *A few words on the Means to be adopted for Establishing a Communication between the Bladder and the Exterior of the Body, when the Urethra has become Impermeable. The last resource available in certain cases.* By EDWARD COCK.

In this paper, Mr. Cock recommends an operation that enables the bladder to be reached, when the catheter cannot be introduced in the ordinary way, and even when the bladder cannot be tapped through the rectum. This operation, which is tapping the urethra as it emerges from the prostate, is thus described:—

"The only instruments required are, a *broad* double-edged knife, with a very sharp point; a large silver probe-pointed director, with a handle; and a canula, or a female catheter modified so that it can be retained in the bladder.

"The patient is to be placed in the usual position for lithotomy; and it is of the utmost importance that the body and pelvis should be straight, so that the median line may be accurately preserved. The left forefinger of the operator

is then introduced into the rectum, the bearings of the prostate are carefully examined and ascertained, and the tip of the finger is lodged at the apex of the gland. The knife is then plunged steadily but boldly into the median line of the perineum, and carried on in a direction towards the tip of the left forefinger, which lies in the rectum. At the same time, by an upward and downward movement, the vertical incision may be carried in the median line to any extent that is considered desirable. The lower extremity of the wound should come to within about half an inch of the anus.

"The knife should never be withdrawn in its progress toward the apex of the prostate; but its onward course must be steadily maintained, until its point can be felt in close proximity to the tip of the left forefinger. When the operator has fully assured himself as to the relative positions of his finger, the apex of the prostate, and the point of his knife, the latter is to be advanced with a motion somewhat obliquely either to the right or the left, and it can hardly fail to pierce the urethra. If, in this step of the operation, the anterior extremity of the prostate should be somewhat incised, it is a matter of no consequence.

"In this operation it is of the utmost importance that the knife be not removed from the wound, and that no deviation be made from its original direction, until the object is accomplished. If the knife be prematurely removed, it will probably when reinserted make a fresh incision, and complicate the desired result. It will be seen that the wound, when completed, represents a triangle; the base being the external vertical incision through the perineum, while the apex, and consequently the point of the knife, impinges on the apex of the prostate. This shape of the wound facilitates the next step of the operation.

"The knife is now withdrawn, but the left forefinger is still retained in the rectum. The probe-pointed director is carried through the wound, and, guided by the left forefinger, enters the urethra and is passed into the bladder. The finger is now withdrawn from the rectum; the left hand grasps the director, and along the groove of this instrument the canula is slid until it enters the bladder.

"The operation is now complete, and it only remains to secure the canula in its place with four pieces of tape, which are fastened to a girth round the loins. There will probably be no escape of urine until the stilette is removed from the catheter.

"A direct communication with the bladder has now been obtained, and the relief to the patient will be immediate."

VII. *On a Case of Vitiligoidea Plana et Tuberosa.* By F. W. PAVY, M. D. Vitiligoidea is the name given by Drs. Addison and Gull to an affection of the skin first described by them in the seventh volume, second series, of the *Reports*. The case here recorded is one exceedingly well marked. The tubercles, by which the disease is marked, were shown under the microscope to consist of nodules of exceedingly dense fibrous tissue, with interspersed fat granules. The examination revealed nothing to lend support to the notion that this disease is of a sebaceous nature.

This paper is illustrated by a coloured plate, containing three figures, showing the appearance of the face and head of the patient, and by a wood-cut, representing the microscopical appearance of a portion of a tubercle.

VIII. *Contributions to the Physiology of Binocular Vision.* By JOSEPH TOWNE. Section VII.

In the former sections of these *Contributions*, the observations had reference chiefly to the stereoscope and stereoscopic results; in the present, the facts are applied and illustrated to exhibit them in their relation to binocular vision. They would seem to lead to these conclusions:—

That we do not see from the orbits, or in the direction of the two eyes.

That the eyes are not the true organs of vision, but must be regarded simply as two cameras, instruments for gathering in the retinal images, but having no action *external to themselves*.

That we see in the direction of the median plane of the head as from one central eye, and that this central eye consists of two symmetrical halves, the right half comprising the right halves of the two retinæ, and commanding the

left side of the external field; the left half comprising the left halves of the retinae, and commanding the right side of the external field.

This paper is accompanied by two plates containing a number of explanatory figures.

IX. *Clinical Remarks on the Treatment of Diseases of the Heart.* By S. O. HABERSHON, M. D.

No class of diseases, as Dr. Habershon says, excite greater alarm than affections of the heart, and in none is greater relief afforded by right treatment. It is not, however, by any direct remedy or specific that alleviation can be effected, but rather by attention to certain plans or principles of treatment, which must serve as our guides in such cases. Their principles are thus excellently well set forth; they are—

1. To lessen the work of the heart.
2. To insure regularity of action.
3. To lessen distension of its cavities.
4. To prevent syncope.
5. To strengthen the muscular fibre of the heart.
6. To hinder the fibrillation of the blood in the heart and great vessels.
7. To prevent secondary complications, and to relieve them when produced.

The advice given to effect these ends is admirable.¹ Several cases of heart disease are appended, as affording illustrations of the practical application of the principles laid down; and they also suggest many points of interest in relation to diagnosis and pathology.

A plate is added to this paper to illustrate a case of disease of the pulmonary valves.

X. *Twelve Cases of Poisoning, apparently from the Use of Copper for Culinary Purposes. Death from poison or disease after nineteen days' illness.* By ALFRED S. TAYLOR, M. D.

This paper, like all similar contributions from Dr. Taylor, is of importance in a medico-legal point of view. He makes one statement which deserves especial attention. The gravy, he says, by which the persons were poisoned, was prepared by stewing the meat with common salt in a badly tinned copper stew-pan, and the liquid allowed to remain in the vessel throughout the night. This mode of preparation, it is said, "involves conditions necessary for impregnating a liquid with a salt of copper."

XI. *On Papillary Tumours of the Gum.* By S. JAMES A. SALTER, M. B., F. R. S.

This paper contains the histories of two very remarkable and extremely rare tumours of the gum. It is illustrated by four woodcuts.

XII. *On Amputation of the Cervix Uteri, and other Methods of Local Treatment, in cases of Malignant Disease of the Uterus and Vagina.* By J. BRAXTON HICKS, M. D.

For amputating the neck of the womb, Dr. Hicks prefers the use of the *écraseur*, a very strong rope of wire being passed around the neck, to the shaft of the instrument, which should be placed in front of the cervix. He states that he has operated, or been present, in more than twenty-eight cases, and has never seen any fatal result or any untoward symptom whatever.

As a styptic to check offensive discharges, Dr. Hicks has found the anhydrous sulphate of zinc, which has been much commended by Sir James Simpson, very efficient. It is readily made by placing the ordinary sulphate of zinc in a porcelain basin over a spirit-lamp. The salt first melts in its water of crystallization, after which it gradually dries; when completely dried it can be powdered. A good form of application is to mix it with glycerine to a paste-like condition. It has a powerful effect upon the abnormal tissue, and but little or none on the sound, and can therefore be used liberally without fear of injury. Should it cause much pain, which it seldom does, this is readily relieved by injection of warm water.

¹ For some further notice of these measures see Quarterly Summary.

XIII. *A Case of Intermittent Hæmaturia, with Remarks.* By WILLIAM W. GULL, M. D.

This disease is characterized by the passing, at intervals, of urine of a dark colour, looking as if it contained blood. No blood-corpuscles, however, are present. Under the microscope are found granules, consisting of very small prismatic crystals of hæmatin, granular casts of the tubules, a few degenerated epithelium-cells, and crystals of oxalate of lime.

The history of the case related in this paper is given in detail, and followed by some very interesting remarks upon the functions of the kidneys. One of the great functions of these organs, as is well known, is to form the colouring matter of the urine from the colouring matter of the blood, and when they are not in a healthy state, the hæmatin is not eliminated in the condition of urine pigment; instead of that, the hæmatin itself passes off. Dr. Gull believes that the renal tubule is not excretive, but secretive and absorptive; and in this opinion, if we are not mistaken, the best anatomists coincide with him.

XIV. *Contributions to the Practical Surgery of New Growths or Tumours, Series V.—Cartilaginous and Bony Growths.* By JOHN BIRKETT.

The cases, nine in number, which are recorded in this series, form an important addition to the literature connected with a class of tumours not often met with, and which cause, at times, errors in diagnosis.

This paper is accompanied by two lithographic plates.

XV. *A Case of Abdominal Tumour.* By S. O. HABERSHON, M. D.

This case is one of cancerous disease of both supra-renal capsules, simulating disease of the spleen and lumbar glands. The symptoms were emaciation, a fixed pain in the region of the growths, irregular perspirations, complete loss of appetite, occasional vomiting, restlessness, want of sleep, and extreme prostration. The physical signs were sallowness of the countenance, and abdominal tumours in both lumbar regions and in the left hypochondrium, with bulging of the lower ribs on the left side.

The case is illustrated by a plate, which shows the relative positions and comparative sizes of both supra-renal capsules and both kidneys.

XVI. *On the Urine in Acute Rheumatism.* By THOMAS STEVENSON, M. D.

This paper contains the details of some cases of acute rheumatism. Each case is thus arranged: After a very brief history of the case the daily excretion, in grains, of urea, uric acid, phosphoric acid, and sulphuric acid, during the acute stage, is stated, and by the side of these quantities are given the corresponding quantities excreted during convalescence, whenever they were ascertained. When the weight of the patient, during health, was known, a table is given which exhibits the proportionate quantities of the above substances excreted for each pound weight of the body. The conclusions arrived at by Dr. Stevenson are these:—

“1. In acute rheumatism, when the excretion of solid materials in the urine is large, the patient makes, other things being equal, a rapid recovery; on the other hand, in lingering cases the excretion of solids is usually small.

“2. As in this disease the urine is invariably scanty in bulk, but (generally from this cause only) of high density, a useful guide to the progress of the case may probably be found by diluting the urine to the normal bulk, and then ascertaining its specific gravity. According as it is now of high or of low density will the progress of the disease probably be favourable or unfavourable.

“3. Though the excretion of urea is usually greater during the height of the disease than during convalescence, this is not invariably the case; the reverse sometimes occurs. Though the excretion of urea is greater during the disease than during the early stage of recovery, the urea in the former stage seldom very much exceeds in amount the normal physiological excretion.

“4. The uric acid is always much increased whilst the disease continues.

“5. The phosphoric acid is generally in greater amount during the progress of the disease than during recovery, but the quantity of this substance rarely much exceeds the quantity secreted in health.

“6. The excretion of sulphuric acid is generally increased, and often largely.

In one instance more was excreted during recovery than during the acute stage of the disease. "The amount of this substance excreted is very variable."

XVII. *Case of Excision of the Spleen for an Enlargement of the Organ, attended with Leucocythemia, in a patient under the care of Dr. Wilks; with Remarks.* By THOMAS BRYANT.

In this case, the patient was operated upon at 2.30 P.M. and died at 4.30 P.M. An examination after death showed a large clot of blood in the abdomen, weighing about one and a half pounds. Whence the hemorrhage had proceeded was not satisfactorily determined.

Mr. Bryant, although the result in this case was unfortunate, is more disposed than ever to operate in similar cases.

XVIII. *Spontaneous Cure of Aneurism of the Aorta.* By WALTER MOXON, M.D.

In this paper the history is given of a patient, where, after his death from cancer, an aneurism of the aorta was found, that had spontaneously healed. The conditions under which a cure has taken place, in this and similar cases, are minutely considered, so that, if possible, these conditions may be imitated. It may be stated, positively, that the cure of aneurism is always associated with wasting of the body, or conditions otherwise equivalent to the method of Valsalva.

This paper is illustrated by two plates, containing four figures.

XIX. *Notes on Cases connected with Obstetric Jurisprudence.* By J. BRAXTON HICKS, M.D.

These cases are of fracture of the skull in new-born infants; fracture of the foetal cranium in utero by the midwife's manipulations; attempt of the mother to injure the child during the pangs of delivery; occurrence of apparent death between the birth of the head and that of the body; spasm of the larynx; and the relative rapidity of the decomposition of the foetus and placenta in utero.

This paper is an interesting one, and some of the observations are new to us. It should be studied by those concerned in medico-legal investigations.

XX. *Cases of Acute Rheumatism treated by Lemon-juice; with Remarks.* By S. OWEN REES, M.D.

The cases of acute rheumatism detailed in this paper are nine in number. They go to show that when lemon-juice is administered two or three ounces, every four, six, or eight hours, the pain is relieved earlier, and the duration of symptoms is less, than when the disease is treated upon the expectant plan. The average duration of the disease in the one case was 6.8 days, in the other 8.5.

XXI. *Select Clinical Reports.* (Memoir V.) By G. H. BARLOW, M.D.

There are five cases reported in this present memoir, all of them cases of rheumatism. Some prefatory remarks are so appropriate and so well expressed that we think proper to quote them:—

"There are few practical questions upon which, as it appears to me, there has been greater diversity of opinion amongst medical men than that of the treatment of acute rheumatism. I do not at present allude so much to the now obsolete practice of indiscriminate bleeding and calomel, as to the later modes of treatment by chemical action, by elimination, and by merely expectant treatment. I am not prepared to say whether chemical remedies produce their effect by the decomposition or neutralization of the peculiar acid present in the blood in rheumatism, but it is nevertheless true that the most successful of these, the lemon-juice, contains a salt of potass, which may be an eliminant, and that citric acid in its uncombined state has not the same efficiency. The occasional success of the expectant treatment, or the giving no active medicine whatever, has been regarded by some as a proof of the inutility of all the other modes of treatment, and by some as an argument against the use of drugs in the treatment of disease in general. What, however, I would urge is that no one of these modes of treatment is most applicable to all cases, and that the success of the expectant treatment only shows that rheumatic fever, like all acute disease, is capable of spontaneous recovery; and that where this recovery is proceeding steadily

and safely the officious use of drugs is to be avoided, and that the skill of the experienced practitioner never appears to greater advantage than in the discrimination of the cases which do not require his interference; but that, on the other hand, many cases will not proceed thus favourably if left to themselves, and in such instances there is occasion for the use, not of a specific remedy, for as yet we know of none such for rheumatism, but of medicines adapted to the exigencies of the particular case."

XXII. *A Second Report of Cases of Acute Rheumatism treated in the Wards of Guy's Hospital, with Remarks on the Natural History of the Disease.* By HENRY G. SUTTON.

This report, as the first one in the preceding number of the *Reports*, gives the history of cases of acute rheumatism treated by mint water alone, or almost alone. The conclusions arrived at are the same.

XXIII. *Cases of Operations on the Larynx.* By ARTHUR E. DURHAM.

Two cases are here related where the larynx was freely opened by an incision in the median line, through the thyroid cartilage, and adjoining parts; in one for the removal of warty growths, in the other for the extraction of a cherry stone. In both the result was satisfactory.

Two remaining papers in this volume are entitled respectively:—

XXIV. *On Diseases of the Retina; with Remarks on its Structure and Normal Conditions.* By C. BADER, and

XXV. *Clinical Remarks on Perforations, and some other Morbid Conditions of the Membrana Tympani.* By JAMES HINTON.

Of these papers we cannot attempt to present an abstract. The first occupies seventy, the second fifty pages, and each is a monograph of rare value, and well worthy of an elaborate review. The one by Mr. Hinton is beautifully illustrated by coloured plates representing various morbid conditions of the membrana tympani.

O si sic omnia! If from every large hospital should issue yearly a volume of "Reports" such as that furnished by the gentlemen forming the medical staff at Guy's, what strides our profession would make! All honour and praise be to them for the noble use they make of their advantages for the common good.

W. F. A.

ART. XVIII.—*St. Bartholomew's Hospital Reports.* Vol. II. London, 1866. 8vo. pp. 264.

For more than thirty years, a volume of reports, as is known to many of our readers, has been annually issued from Guy's Hospital. The great favour with which those volumes have been received, from their making widely known the practice of one of the leading hospitals of London, and thus throwing open to the whole profession a large emporium of knowledge, which would otherwise have been restricted to the hospital staff and pupils; and likewise the reputation which that publication has obtained for the medical school, and the stimulus it has imparted to the clinical pursuits of the pupils, have induced several other London hospitals to follow the example set by Guy's.

The volume before us, issued from St. Bartholomew's, is the second that has appeared, and is creditable to that venerable institution. It contains twenty-six articles, a brief abstract of which we shall lay before our readers.

Art. I. *Pathological Anatomy of the Kidney.* By REGINALD SOUTHEY, M.D.

In this paper the author treats in separate divisions of the pathological conditions of the cellular, vascular, and glandular elements. Under the first, he includes *hypertrophy* and *cellular hyperplasy*; the former being "a simple increase of the intercellular elements or substance;" the latter "those changes which take origin from the cells of the connective tissue." He observes, that

portions of the stroma in the medullary portions of the kidney at times assume an hypertrophied condition, and are apt to be mistaken for tubercles, but differ from them in their larger size and opaque white appearance. With the vascular condition he treats of the so-called, amyloid change, believing it to be due simply to the thickening of the walls of the renal vessels at the expense of their calibres, and quotes Schmidt and Kekulé to prove that the material characterizing it is of an albuminous nature, having no relation whatever to cellulose. In its early stages, it is often confounded with diseases to which it has, in reality, no affinity. "The kidney may be firm, level, smooth, rather large, the capsule non-adherent, the tissues somewhat over-translucent, and yet there may exist no amyloid change whatever in the vessels; again, it may present no apparent trace of disease, and yet prove amyloid in a high degree. It may have every look of having been the seat of old glandular disease, be small, granular looking, with an adherent capsule, and an irregularly packed surface, with diminished cortical and vascular and drawn-up medullary portion, yet still be the seat of extensive amyloid degeneration." An instructive account of vascular obstruction is given. If the artery plugged by an embolus be small, an ecchymosed area, at times of a dusky hue, results, which subsequently becomes yellow from within outwards. Venous obstruction (thrombosis) is rarely complete, more or less blood returning through or around the clot. Cystoid degeneration is considered to be a disease of the glandular element; and is observed to be invariably associated with the straight tubes as a result of their obstruction.

No allusion is made to cancer, tubercle, or to effects of inflammation, and presence of calculi. The apparent object of the paper is to present some account of the pathology of the more obscure conditions of the organ. Although unaccompanied with illustrations or cases, the descriptions bear evidence of careful observation.

Art. II. *On Congenital Cystic Tumour.* By THOMAS SMITH.

The author gives an account of a class of tumours presenting the characters of cystic growths, but not deriving, so far as is shown, any peculiar features from their intra-uterine origin. They are confined to the trunk, and when placed along the line of the spine, may be confounded with spina bifida. Eight cases of the disease, occurring under the author's observation, are recorded. Six were cured by operation with the seton, to which decided preference is given; while spontaneous cures were effected in the remaining two.

Art. III. *Practical Observations on Diphtheria.* By W. NEWMAN, M. D.

This article furnishes a digest of our knowledge of the disease to the stock of which Dr. Newman makes no pretension to addition. He recommends application of strong hydrochloric acid, diluted one-half by honey or water, to the fauces once or twice in the twenty-four hours. He places little value upon gargles, and is opposed to any means of counter-irritation. He recommends the use of the chlorates internally. The following formula, combining an efficient local application, and a means of introducing chlorine readily into the system, may be employed with asserted advantage. R. Potass. chloratis, \mathfrak{ssj} ; acid. hydrochloric. $\mathfrak{f}\mathfrak{ssj}$; aq. destillat. $\mathfrak{f}\mathfrak{ssj}$. Mix the acid and water together first; add the mixture to the chlorate of potash, and keep the whole in a dark place; \mathfrak{ssj} of this solution to be mixed with a pint of water, of which the dose is one or two tablespoonfuls, according to age, for internal use; or a wash for mouths or gargle. In speaking of diet, he says: "No existence of feverish symptoms, should, for a moment, be deemed warrant for confining a child to low diet. New milk is of very much value, and may be used in large quantities. Farinaceous articles are least to be trusted to."

Art. IV. *On the Relation of Phlebitis and Thrombosis to Pyæmia.* By WM. S. SAVORY, F. R. S.

The author presents an elaborate paper upon this subject, giving, in addition to his own, the views of pathologists, from the well-known experiments of Cruveilhier to our own time. But no new facts are presented; and it is by such alone that this much mooted point can be settled. He concludes as follows: "The sum of all that has been said amounts to this—

"Thrombosis may exist without any evidence of phlebitis, and very often occurs without being followed by pyæmia.

"Phlebitis may occasionally exist without thrombosis, and often occurs without being followed by pyæmia.

"Pyæmia often exists without any evidence of thrombosis or phlebitis; still oftener it occurs without any evidence whatever, that it has been preceded by either of these, or of any other affection of the veins."

Art. V. *Case of Intracranial Cyst containing Hair; also a Case illustrating the Physiological Action of Iodine.* By WM. TURNER.

The first case is that of a tumour, assigned to the group of cutaneous proliferous cysts of Paget, placed between the dura mater and occipital bone, of a child æt. 23 months; it being held by the author to have had at an early period communication with the integument. The second case is that noticed in the person of a chemist who was attacked with catarrh and excessive flow of tears, with smarting and photophobia, occasioned by exposure to the fumes of iodine and hydriodic acid. It is chiefly interesting from the rarity of the vapour of iodine acting upon a mucous surface to induce local iodism.

Art. VI. *Remarks on the Use of the Thermometer in Disease.* By JOHN SOUTHEY WARTER, M.D.

This paper furnishes the results of a series of daily observations extending over a period of two years. The temperature in diseases of the blood, lungs, abdomen, brain, and spinal cord, are treated of in order. In speaking of the distinction between typhus and typhoid fevers, he uses the following language: "In typhus fever running its usual course, there seems a direct ratio between the rapidity of the circulation and the heat of the body; the pulse and temperature rising together till the fever reaches its climax, when the pulse ranges generally from 110 to 144, and the temperature from 103° to 104° F. At one time, I used to think, that a low pulse and high temperature at the commencement of fever always indicated that it was specifically typhoid, but more extended observation has taught me that there are many exceptions to this rule; thus, occasionally, in febricula, rheumatism, tonsillitis, exhaustion from suckling, and phthisis pulmonalis, a temperature of 102° or 103° may occur with a low pulse rate; and these exceptions are the more worthy of attention as the aspect is in them often typically that of the early stage of typhoid fever; thus, in all there may be a clear, white, and perspiring skin, red lips, tinted cheeks, and dilated pupils, and hence, without some closer investigation, a superficial observer may be often deceived in his diagnosis. Perhaps the cases of enteric fever, in which the diagnostic use of the thermometer is most striking, are those in which malaise, and, perhaps, some diarrhœa have existed for several days, and yet the patient has got about; one day at length, however, the doctor is consulted, and finding the tongue clean and the pulse quiet, he is thrown from his guard, and is about to think but little of the attack; wishing to make sure, however, ere he dismisses his patient, he places his thermometer in the axillæ, and the mercury rising to 102° or 104° shows him that it is typhoid fever, and not a simple diarrhœa that he has to deal with. Again, in how many cases of supposed typhus does the thermometer, by marking a low temperature, contradict every other symptom! There may be a history of exposure to infection, a rigor may have occurred, the face may be muddy, the eyes injected, the pupils small, the pulse rapid, and the tongue thickly furred; still, if with all this the temperature at midday is below 99.5° or 100°, typhus fever, at any rate, may be stated positively not to exist." "In typhus, the pulse and temperature rise more or less together until the seventh, eighth, or ninth day, when they are at their highest; then they begin to decline, and drop steadily day by day in unison, both becoming normal about the fifteenth or sixteenth day. In typhoid fever, however, all is chaos; the pulse and temperature rise and fall irregularly." The author finds the temperature in active tuberculosis always elevated some time during the day, and it also follows the rule of being higher in the evening than in the morning; while cancer, in its ordinary form, does not give rise to any increase of temperature. The value of the thermometer was made less evident in diseases of the abdomen. Softening of the spinal cord in one instance caused a tem-

perature of 106°, though nervous affection generally, whether functional or organic, indicated a slight elevation of the temperature.

Art. VII. *On the Treatment of Enlarged Bursa over the Patella.* By WM. S. SAVORY, F. R. S.

The method preferred by the author is displacement of the tumour by puncture with the lancet, and subsequent equable compression by bandaging. In the event of the sac's refilling, the operation must be repeated. Should suppuration come on, poultices are to be substituted for compression. It is claimed by Mr. Savory that this method is safer and more expeditious in effecting cure than by either seton or extirpation.

Art. VIII. *On Gouty and some other Forms of Phlebitis.* By JAMES PAGET, F. R. S.

Gouty phlebitis appears to differ from other forms by its tendency to symmetrical metastasis, a fact which points towards the primary invasion of the walls of the veins, and, by its peculiar tendency, to recur. From the cases observed—the number is not given—one case alone proved fatal. Two cases of idiopathic phlebitis, both apparently dependent upon blood-poisoning from tainted atmosphere, are detailed: in one of which a man, æt. 42, who died after three weeks' illness, without symptoms of embolism, the vein of both upper and lower extremities were found to be inflamed and filled with clots. The heart was fatty, but without clots, while abscesses were detected. Markedly in contrast to such a condition is that described as following obstruction of single portions of great veins. Three cases are recorded where such a lesion was thought to have been recognized. The limb in all instances appeared as though increasing in muscular power, and the author believes, real enlargement of the muscles of the limb to have taken place. The superficial veins were over full, the skin was pale or dusky, and marked with small bluish spots, while cool to the touch.

Art. IX. *Case of Congenital Myopia; with a faulty perception of colours limited to a small portion of one retina, of recent origin.* By BOWATER J. VERNON.

Mr. Vernon gives a minute description of this case which is interesting from the fact that imperfect perception of colors existed in the retina of the right eye, while that of the left was in every respect perfect.

Art. X. *Respecting Rupture of the Axillary Artery in Reducing Dislocation at the Shoulder-Joint.* By GEORGE W. CAMDEN.

In this paper is detailed a case of dislocation downwards and forwards in which, while the author was effecting reduction by manipulation during the sixth week, the axillary artery was ruptured. The vessel was tied five weeks afterwards; gangrene following on the fifth day, and death from pulmonary embolism on the seventh. A similar case, Mr. Paget's, is given in which the operation, performed three months after the accident, was entirely successful. The remainder of the article is devoted to brief notices of thirty-one recorded examples of the lesion. It is remarked that the occurrence of the accident is most common among persons over fifty years of age, a fact which does not, in the estimation of the writer, militate against attempt at reduction by manipulation where the arteries are not suspected of being diseased.

Art. XI. *Remarks on the Rectangular Talipes Equinus of Orthopædic Surgery.* By HOLMES COOTE.

The author gives a brief notice of a deformity of the foot due to a "state of tension of the gastrocnemius muscle," sufficient to prevent proper flexion and extension, but not to the degree occasioning the typical deformity of talipes equinus. When paroxysmal, attention to the general health is at times remedial; but "in the majority of cases the division of the Achilles tendon becomes ultimately necessary." The paper is illustrated with a wood-cut.

Art. XII. *On the Treatment of Irreducible Hernia.* By JOHN LARGTON.

The plan proposed is that of steady and uniform pressure by means of a compressing bandage. A "fair amount of success" is claimed for it, and cases

of irreducible hernia rendered reducible through its agency are narrated. While we can understand the efficacy of such pressure upon an old rupture, all things being equal, we would entertain doubts as to the propriety of its employment in those cases removed from the watchfulness of the surgeons, as when persons follow their ordinary occupations while under treatment.

Art. XIII. *Case of Wound of the Right Lumbar Region, involving and laying bare the Kidney; complete Recovery.* By BOWATER J. VERNON.

Mr. Vernon narrates an interesting case of wound of right kidney in the person of a lad who fell from a height of forty feet upon his loins. The inferior extremity of the organ protruded. It was seen to be of a dull red-brown colour, "and moved freely with each contraction of the diaphragm;" its wounded surface had a fibrous appearance, and was free from blood. Urine escaped from the opening, and continued at intervals to pass away through the external wound during recovery, which was completed at about the tenth week.

Art. XIV. *The Inheritance of Cancer, and its Relations to Questions concerning the Local or Constitutional Origin of the Disease.* By W. MORRANT BAKER.

This paper is made up of deductions from a tabulation of 103 cases, to the effect that a pre-existing constitutional condition is necessary for the local development of cancer.

Art. XV. *Observations on the Pathology and Treatment of Joint Disease.* By HOLMES COOTE.

Chronic inflammation of the cancellous structure of bone is believed by the author to be the cause of a form of arthritic disease characterized by enlargement of the affected bone, with constant and abiding pain in the adjacent joint, unattended by synovial inflammation.

Art. XVI. *On the Prejudicial Effect of Inter-Articular Pressure in Joint Disease; and the Application of Continuous Extension, by means of a Weight, as a Remedy for this Condition.* By T. HOWARD MARSH.

The author discusses the advantages of extension in strumous joint disease, and in cases of deformity from burn. No mention is made of the operation of tenotomy now so favourably recognized by American surgeons.

Art. XVII. *Notes on Oxaluria.* By DYCE DUCKWORTH, M. D.

The author briefly details five experiments confirming the effects of ingesta in inducing oxaluria; and indicates the presence of the acid in the urine during the convalescent stage of the majority of acute disorders.

Art. XVIII. *On the Treatment of Acute Pericarditis by Opium.* By FREDERIC J. FARRE, M. D.

Eleven cases are presented, in nine of which the average duration of the disease was fifteen days, the shortest being three days. The opium was administered in grain doses every six hours, combined with camphor; in conjunction with bicarbonate of potash 20 grs. three times a day. Pain was relieved by leeches beneath left scapula, and blisters over region of heart.

Art. XIX. *Surgical Cases, Devon and Exeter Hospitals.* By PHILIP CHILWELL DELAGARDE.

In this paper seven different subjects are introduced in as many pages. The result is unsatisfactory. In the record of a case of resection of the head of the femur for unreduced luxation into the sciatic notch, the author makes no mention of the after-treatment, or condition of the limb upon recovery, but concludes by saying "the relief was immediate." A case of traumatic tetanus with recovery which supervened upon injuries incurred from a waggon passing over both thighs, is given. The disease set in three weeks after accident, and under supportive treatment, terminated favourably in seventeen days.

Art. XX. *Case of Profuse Venous Hemorrhage from the Left Meatus Auditorius Externus, consequent on a Fall upon the Back of the Head.* By LUTHER HOLDEN.

A drunken man, while walking in the street, falls and strikes his head against

a lamp-post. Profuse hemorrhage takes place from left ear. The meatus is plugged, and the bleeding ceases. He does well until the twelfth day, when renewed bleeding follows the removal of the plug. The case terminates in recovery, but with loss of hearing in ear of affected side, upon the twenty-fourth day. The probable source of hemorrhage was from the lateral sinus, which rupturing the mastoid cells, allowed the escape of blood through the lacerated tympanic membrane.

Art. XXI. *Case of Aneurism of the Lower Part of the Common Iliac, of the External Iliac and Femoral Arteries, successfully treated by Pressure of the Abdominal Aorta.* By VINCENT F. ECK.

Four hours' firm and continued compression by a Lister's tourniquet is reported to have cured an aneurism of two years' standing. In one month after operation the patient was entirely well.

Art. XXII. *Medical and Surgical Landmarks.* By LUTHER HOLDEN.

"In going round the wards of the hospital I often have occasion to point out, on the surface of the living body, any landmark—such as a line, an eminence, a depression, which is a guide to, or an indication of, deeper-seated parts; and I find this practice all the more useful, because many, even advanced students of anatomy, are not so ready as they ought to be in recognition of parts when covered by skin. They are familiar enough with the bones, muscles, and blood-vessels displayed in the dissected subject, but are often at fault when they come to put this knowledge into practice." Following these prefatory remarks, the author briefly indicates the chief features or "landmarks" having valuable surgical relations of the several regions, commencing with those of the head; this article, which promises to be one of a series, terminates with the region of the back. In speaking of parotid abscess he recommends holding the blade of the knife horizontally, so as to be less likely to injure the branches of the facial nerve. He countenances the division of the gustatory nerve for temporary relief of pain in carcinoma of the tongue. The following are apt remarks upon tracheotomy: "In the dead subject nothing is more easy than to open the trachea; in the living, no operation may be attended with greater difficulties. You must expect to find the patient with his head bent forwards, and the chin dropped, to relax as much as possible the parts in the neck. On raising his head a paroxysm of dyspnoea is almost sure to come on, threatening instant suffocation. The elevator and depressor muscles draw the trachea and larynx up and down with a rapidity and a force which may bring the cricoid cartilage within half an inch of the sternum. The great thyroid veins which descend in front of the trachea are sure to be distended. There may be a middle thyroid artery. In children two lobes of the thymus may rise in front of the trachea as high as the thyroid gland, so that the whole length of the air tube may be covered by important parts which ought not to be divided. Considering all these possible complications, the least difficult mode of proceeding is to open the trachea just below the cricoid cartilage, and if room be requisite, to divide the cricoid itself."

The conception of this series of articles is a very happy one, and capable of indefinite elaboration. It will be observed the author does not confine himself to the anatomy alone. The hints in treatment scattered here and there are valuable and recognized as coming from a practical hand. But when he asserts "in the language of transcendental anatomy, we may say that the central tendon of the omohyoid represents a rudimentary cervical rib," and that "its posterior belly is analogous to a serration of the serratus magnus; its anterior belly to a sterno-hyoid," we are reminded that the observation of the transverse processes of the cervical vertebrae being the *true* rudiments of cervical ribs, has been confirmed; and are inclined to believe that no "transcendental" anatomist will accept the language of the author as a part of his own.

Art. XXIII. *Note on the Termination of the Second Case of Poisoning by Mercuric Methylene.* By GEORGE N. EDWARDS, M. D.

This article is the continuation of a case reported vol. i, p. 114, and is chiefly devoted to a description of the post-mortem examination.

Art. XXIV. *On an Operation for the Relief of a Stricture of the Urethra.* By GEO. W. CALLENDER.

The author, following a suggestion of John Hunter's, performed a perineal section in the following manner: The bladder having been previously punctured in the supra-pubic region for retention, a curved catheter was introduced through the opening and guided into the urethra from behind forwards to the point of stricture. A straight catheter was then passed to the contracted portion from in front, and the line of incision made between the extremities of the two instruments. The patient was discharged cured in about three months after operation.

Art. XXV. *On the Value of Palpation in the Diagnosis of Tubercular Disease of the Lungs.* By GEO. N. EDWARDS, M. D.

Dr. Edwards presents a table of fifty cases of phthisis in which the locality of the deposit was recognized by him by palpation alone, the assertion in each instance being afterwards confirmed by others by auscultation and percussion. The author concludes by saying: "It is almost impossible to express in words what is the difference between the sensation imparted by that portion of the chest situated over tubercular and that over healthy lungs; perhaps it may rather be described as a want of elasticity than anything else. I only know that it exists, and may be easily perceived by any one who will examine a sufficient number of cases."

Art. XXVI. *Extracts from the Statistical Report of the Hospital for the Year 1865.*

This is an elaborate statement of the number, character, and results of treatment of the diseases and injuries admitted during the year. Tables 4 and 5 are particularly valuable, showing as they do the proportion of "diseases occurring within the hospital in patients admitted for other causes in the surgical wards," as well as "cause of death in fifty patients after operation." Among the latter we notice a death from pyæmia following lithotripsy. H. A.

ART. XIX.—*Proceedings of the American Pharmaceutical Association at the Fourteenth Annual Meeting, held at Detroit, Mich., August, 1866.* 8vo. pp. 316. Philadelphia, 1866: Merrihew & Son, Printers.

LIKE its predecessors, this volume is a record highly creditable to the "American Pharmaceutical Association," as well as to the profession of pharmacy in the United States. The phonographic report of the proceedings at the several daily sessions of the annual meeting is interesting and instructive. The reports of the committees manifest a frank truth-seeking and truth-exposing disposition which inspires confidence in their accuracy. The report on the progress of pharmacy includes a list of publications, in the English, German, and French languages, connected with the subject, brief notices of processes, apparatus, &c., as well as of articles of materia medica, vegetable, animal, and inorganic, with modified and novel chemical processes, so that we have a condensed summary of whatever has been offered to the attention of "pharmacists" during the year preceeding the date of the report. The volume contains also ten "special" and twelve "volunteer" reports and essays. Answers to queries propounded at previous meetings are termed special reports. For example: "Query 30th. What is the most perfect and reliable process of manipulation to produce liquor ammoniæ acetatis pure, and in a neutral or slightly acid condition?" The answer is by Wilson H. Pile, M. D. In order to avoid the objections to the usual practice of dispensing ammoniæ acetatis liquor by apothecaries, he proposes that solutions of sesqui-carbonate of ammonia and of acetic acid of proper specific gravity, shall be kept separately prepared in the shop. "The solutions keep well, and it is only necessary to mix them in equal quanti-

ties to produce an effervescent draught of neutral acetate of ammonia, retaining the free carbonic acid, so desirable as a remedial agent."

Mr. James T. King, of Middletown, N. Y., contributes a short paper—*Metallic Lead in Flour*—in which he states that during February, March, and April, 1865, about 250 persons within a radius of five miles were affected with symptoms of poisoning by lead, which was traced to repairing with metallic lead the burrstone on which the flour used by the patients had been made.

The "Proceedings" of the annual meetings of the "American Pharmaceutical Association" ought to be included in the library of every "pharmacist" who desires to keep pace with scientific progress; we may add, practitioners of medicine generally cannot consult the work without adding items of practical value to their stock of knowledge. We commend this volume to the attention of both physicians and apothecaries, or, as it is proposed to style them, pharmacists.

W. S. W. R.

ART. XX.—*Clinical Histories with Comments.* By HENRY DAY, M. D., Member of the Royal College of Physicians; Physician to the Stafford County Infirmary. 8vo. pp. 254. London, 1866.

THE work of Dr. Day is composed of short clinical histories of various diseases, with comments in respect to certain points of their etiology, diagnosis, or treatment. These histories are not presented by the author as claiming "the highest position in medical research." They are in general based upon too limited a number of observations to warrant any such claim being set up in their behalf. All that the author has aimed at is, through the pages of the work before us, "to speak to his brethren in common language" on subjects of common interest. He has not presumed to teach them, but has endeavoured in a humble way to quicken their interest in the subjects embraced in his clinical histories, and to elicit from each whatever knowledge he may possess in respect to them. The same plan is pursued as marked the earlier steps in the history of medicine, whether as a science or an art. This plan is one of great simplicity, and must continue to be pursued so long as it shall be esteemed desirable for the materials adapted to advance our knowledge of medicine derived from the experience and investigations of the individual members of our profession shall be promptly incorporated with the general fund of medical knowledge.

In the several sections, or histories, as the author styles them—each one of which is devoted to a single subject—we find nothing that is absolutely original, though much that is interesting. It appears to us that the author has added but little to our knowledge of the especial subjects of which the work before us treats.

It is scarcely to be supposed, however, that, in a collection of clinical observations related with the same candor and honesty of purpose as are those before us, there should not be found some useful facts—some instructive hints, which if not, strictly speaking new, are, at least, adapted to illustrate, verify, and enforce truths already known. It is certain that many such facts and hints occur in the *Clinical Histories* of Dr. Day.

The first history treats of "*Cerebro-Spinal Meningitis*," showing its identity with the so-called spotted fever, and discussing its general pathology, and its supposed causes, with an effort to remove the uncertainty which surrounds the question of its treatment. We cannot see, however, that the histories adduced by Dr. Day throw any new light upon the nature of the disease or upon its management.

The second history is devoted to a description of a very interesting, and rather unique, so far, at least, as concerns its termination, case of "*Ovarian Disease*." The ovarian cyst burst and its contents were discharged through the stomach, the patient finally recovering completely.

A married woman, 43 years of age, the mother of many children, was admitted into the Stafford Infirmary, February 3d, 1862. She was suffering under

ovarian dropsy, which, as she stated, had commenced four years previously. She presented a jaded and cachectic appearance. Her lower limbs were œdematous, the abdominal walls were enormously distended, the ovarian tumour, which evidently contained a fluid, seemingly pressed upon them throughout their entire extent. The surface of the tumour was uneven and marked by many sulci or grooves. The bowels were obstinately costive. At intervals there occurred paroxysms of severe pain: No appetite; sleep uncertain and disturbed; breathing difficult; pulse small, weak, rapid—about 98; menstruation irregular, the discharge of a somewhat offensive odour. *Diagnosis*; multilocular ovarian tumour, with considerable adhesions. The patient was decidedly opposed to the performance of an operation. She had chlorodyne given her at night, which soothed her sufferings. The costiveness was relieved by mild purgatives and simple enemata. The diet directed was any her stomach, which was very irritable, could retain and digest. No trace of albumen in urine. It was high-coloured, of a specific gravity of 1.025; reaction acid; deposited large quantities of lithates. The patient continued, with little change, excepting increased weakness, until March the 8th, when, during the day, she complained of great pain in both the abdominal and epigastric regions; this she had previously suffered. Early on the morning of the 9th she became very sick with aggravation of pain. She soon began to vomit large quantities of a thick glutinous fluid, darkish green in colour, exactly similar to that which follows the tapping of an ovarian cyst. The vomiting continued for twelve days, giving discharge to not less than two or three gallons of the fluid described, in which was occasionally detected a flaky kind of matter, not unlike coagulable lymph, and sometimes small masses of more solid matter. The stomach not retaining any food, the patient was nourished by means of beef-tea injections, &c. To allay the sickness of stomach, dilute hydrocyanic acid with saline effervescents, &c., was prescribed, but without any good result.

As the vomiting continued the circumference of the abdomen diminished rapidly. On the 21st the vomiting ceased, and a little food was retained on the stomach. Up to the 27th she gradually and steadily improved. She took light, easily-digested food with a relish; slept tolerably well; expression of countenance greatly improved; pulse became gradually stronger and firmer; bowels acting without the aid of aperients. Improvement continued until the 28th, when the patient was attacked with double pneumonia; the inflammation chiefly confined to the lower lobes of the lungs. Cough incessant with copious expectoration; sputa rust-coloured; pulse weak and rapid. She was placed for many hours on large doses of ammonia, plenty of beef-tea and wine. No improvement ensuing, her chest all round was wrapped in a large warm poultice of flaxseed meal. The relief afforded by the poultice was marked and prompt. The patient fell asleep soon after it was put on, and slept for several hours. The poultice was continued for several days. From this time she daily improved. She was discharged convalescent May 1st. There was still a tumour on the right side, midway between the umbilicus and groin. It was of the size of a large orange, with an irregular surface, and painful when pressed on. The legs were still slightly œdematous. She attended as an out-patient for about two months; both the œdema and the remains of tumour constantly diminishing. It was ascertained in 1864 that she had recently died—not from ovarian disease but from fever.

The lymphlike matters discharged by vomiting in this case, when examined by the microscope, were shown to be structureless in appearance; there was nothing discovered resembling an acephalocyst. The fluid was loaded with albumen, with a specific gravity of 1.022—sometimes much higher. It was at first too thick to allow of the ready use of the hydrometer.

In the third history, the subject of which is "*Secondary Cancer of the Lung*," the details are given of a series of experiments performed by Dr. Richardson, to determine whether the fluid expressed from cancer growths is capable of producing locally cancer when introduced in the healthy tissues of animals. The experiments were communicated by Dr. R. to the Medical Society of London, during its session of 1859-60, but never before published. The experiments prove, so far, at least, as negative evidence can prove, that cancer cannot be

introduced into the human system, nor propagated from one portion of it to another simply by inoculation.

The fourth history is on the "*Treatment of Acute Rheumatism by Blisters.*" After the relation of six cases in proof of the efficacy of this plan of treatment, Dr. D. remarks that, after the proof he has had he cannot hesitate to express his belief that blisters will be found a most valuable adjunct in the treatment of a most troublesome and for the most part painful malady. In every case he has tried them the relief from the rheumatic pain has been immediate and most commonly permanent. In no case has peri- or endocardial inflammation supervened. None of Dr. D.'s cases, however, were treated by blisters alone. He is convinced that every case of acute rheumatism should be treated on its own merits. Each case may require some modification in its management, and *special* remedies must all be used to some extent in an empirical manner until the special pathology of rheumatism is better understood. In the words of Dr. Fuller, "What we want is far less the discovery of any new remedies, than the adaptation of our present remedies to the exigencies of each case."

The only inconvenience that has been observed to result from the blistering treatment has been the occasional length of time which elapses before the vesicated surfaces heal.

The effect upon the urine of blistering is very marked, we are told. However acid before the blisters are applied, the urine becomes, speedily after their application, either alkaline or neutral, and this too, in cases where no alkaline substance had been administered.

On "*Rheumatic Fever without Pain*" is the subject of history or section fifth. Whether the cases detailed by Dr. D. under this head were rheumatic in character, it is very difficult to decide with certainty, inasmuch as there is as yet no positive agreement among physicians as to the true nature and diagnosis of rheumatism. To call them cases of rheumatic fever is certainly a misnomer; they present none, so far as we can see, of the pathognomonic signs of fever. Dr. D. concludes his remarks upon painless rheumatic fever by expressing his opinion that a close attention to the state of the spinal nerves in both acute and subacute rheumatism, coupled with a carefully conducted experimental inquiry, would tend, ere long, "to show that this very common and very intractable malady is infinitely more dependent on primary changes in the nervous system than has ever hitherto been imagined by any excepting our American medical brethren." The dependence of some, at least, of the forms of disease that have been arranged under the vague term rheumatic upon certain morbid conditions of the spinal cord, cannot, we think, be any longer called into question.

In the sixth history, Dr. D. has attempted to show that "Chorea" is in many cases dependent on spinal irritation. The correctness of this position, though far from being proved by the observations of Dr. D., is nevertheless, we feel assured, a perfectly tenable one. As the author well remarks, between the numerous cases of chorea in which the irregular muscular movements are easily arrested, and those in which they are persistent and the disease often terminates unfavourably, there must necessarily be either the operation of a different cause, or the action of the cause, if the same, must be modified by some peculiar conditions. Dr. D. believes that in the milder and more controllable forms of chorea there are merely functional disturbances, the result most probably of sympathy without any active inflammatory action, while in the graver attacks there is *always* going on a local lesion of a severe character. True, the former might possibly run on into the latter; the experience of Dr. D. would almost lead him to say that such is rarely the case. In the cases he has seen there has always been a very wide difference in the *kind* of spasmodic action in the two forms of the disease alluded to. In the milder and sympathetic state—that of mere functional disturbance, the movements, although certainly spasmodic, have been *graceful* in their form, giving an impression that they were rather exaggerated natural motions, to a certain extent controllable, whilst in the severer forms all control is evidently gone, and the spasmodic affection seems to partake of the nature of tetanus.

From history or section seventh, the subject of which is "*Picric Hematocle,*" we copy the following remarks: "There is great diversity of opinion as to the

propriety or not of puncturing in a case of hæmatocele. Some are disposed to puncture if the tumour be extra-peritoneal, and to adopt a different or rather an opposite course if it be intra-peritoneal. But the cases are many in which you cannot possibly tell which of the two positions the tumour occupies. Others are not inclined to resort to the trochar unless *compelled* to do so by the urgency of the symptoms. This, I own, is my feelings on the subject, and upon it I acted in E. P.'s case. With the result I had no reason to be dissatisfied."

We might run through the remaining six histories, on epilepsy from peripheral irritation; and from hepatic congestion; on alternating leucocythemia and leucocythemia generally; hysterical facial paralysis; and cardiac apnœa—formerly called angina pectoris. From each we might perhaps cull an observation which, if not precisely new, is worthy of especial notice. From the foregoing notice of the work, however, our readers will be able to form a tolerably correct idea of its character, and of the nature and extent of the author's contributions to the general fund of medical knowledge.

D. F. C.

ART. XXI. — *Contributions to Assist the Study of Ovarian Physiology and Pathology.* By CHARLES G. RITCHIE, M.D., Fellow of the Royal Medico-Chirurgical Society, Member of the London Obstetrical Society, Corresponding Fellow of the Edinburgh Obstetrical Society, etc. 8vo. pp. 208. London, 1865: John Churchill, and Sons.

IN this excellent monograph, Dr. Ritchie maintains that active changes are incessantly taking place in the ovary from the earliest to the latest period of life; that both before and after puberty, during pregnancy and lactation, during amenorrhœa, and even after the final cessation of the menses, vesicles are constantly being formed in the ovary, and constantly perishing. He endeavours, also, to show that ovarian cysts may be produced in many different ways, each morbid process being a modification of some physiological action occurring normally in the ovary; that these cysts are occasionally "moles" or ova which have undergone a certain amount of development; and that dermoid cysts are certainly derived from an ovum, and have little in common with that form of subcutaneous dermoid cyst not unfrequently met with in the region of the eyelids.

The first chapter contains an interesting historical sketch of the progress of embryology from the remote time of Hippocrates down to the year 1844. The next two chapters consist of a reprint of a paper on the physiology of the human ovary, contributed originally to the *London Medical Gazette* of 1843-45, by Dr. Ritchie, of Glasgow, the father of our author.

The following conclusions arrived at, by the senior Dr. Ritchie, in the course of his researches, are also strongly advocated by his son.

"1. The Fallopian tubes of the infant, and of the child before puberty, are perfect in their structure, although their patency is more or less obstructed at birth by the presence in them and in the uterus of a tenacious glue-coloured mucus.

"2. The ovaries of new-born infants and children are occupied, sometimes numerous, by Graafian vesicles or ovisacs, which are highly vascular as early as the sixth year, and vary in size from the bulk of a coriander-seed to that of a small raisin, in the fourteenth year, at which time, also, they are filled with their usual transparent granular fluid.

"3. The Graafian vesicles contained in the ovaries prior to menstruation are found, as they also are in every other period of life, in continual progression towards the circumference of the glands, which they penetrate, discharging themselves by circular-shaped capillary-sized pores or openings in the peritoneal coat; the presence of the catamenia being thus no indispensable prerequisite to their rupture.

"4. The establishment of menstruation does not necessarily give rise to any immediate modification in the manner in which the ovisacs are discharged, or in the subsequent change which these bodies undergo; but in some cases the

conditions which obtain in the period before puberty are extended for a time, into that of menstruation.

"5. The ovisacs of the human female do not require the establishment or presence of menstruation for their development or rupture. Vesicles of adult size may exist and be discharged about the age of puberty as also at other periods of life, independently of menstruation; and this state may be present in its normal form for at least eight consecutive periods, without a vesicle being ruptured, unless after the manner, and with the phenomena which occur in childhood.

"6. In early infancy, extreme old age, and long-continued organic disease, the ova are minute, transparent, and structureless cells; and in advanced childhood, soon after the critical age, and during pregnancy and lactation, they are more or less organized, larger, and in the latter state are often so well matured, that about one-third of the renewed pregnancies of married women take place while they nurse.

"7. In children and others in the circumstances now mentioned, the exercise of organic power which occasions the secretion and extrusion of ova, is attended also by that of an opaque mucous fluid in the tubes and uterus; but on the attainment by the female of maturity, and onward to the period of critical life (when the animal powers become again diminished, and the calibre of the arteries reduced), the ovarian orgasm, like many other vital actions, undergoes periodical augmentations of power, during which, unless when prevented by the disturbing influence of other functional processes or by disease, it extends to the nervous and vascular tissues of the uterus, and gives rise to the formation within this viscus of decidual vessels, which exude lymph and red globules, the latter being evacuated, mixed with watery fluid, mucous matter, and some of the salts of the blood, in the form of menstruation.

"8. That the periodical congestion or increase in size of the ovaries before and at the usual menstrual terms is not caused by the presence or bursting of ripe vesicles, is plain from the consideration that the ovaries are often crowded with such, some of which also occasionally give way, and empty themselves by capillary-sized openings in the surface of the glands in women who have never menstruated; and in others who have ceased to menstruate, one and two large and fully-developed vesicles are frequently seen.

"9. The elimination of ova, and the process of menstruation, are correlative effects of the vital powers of the ovaries (just as the secretion of mucus, and of gastric juice, and the chymification of the blood are those of the stomach); and to suppose the rupture of the Graafian vesicles to be the cause of the menses, is to mistake a frequent association, and, to some extent, effect for a uniform cause.

"10. The principal use of menstruation is, in regard to the ovary, to provide an accessory by which the maturation of its vesicles, and the absorption of their peritoneal and tenacious proper coats, and their extension generally, may be promoted throughout the child-bearing period of life; and, in reference to the uterus, to furnish a nidus within its walls by which the ovum may be entangled, retained and nourished.

The last two chapters of the work before us are devoted to ovarian pathology.
J. A. M.

ART. XXII.—*Temperature in Acute Disease*.—Being a thesis read for the Degree of Doctor in Medicine, before the University of Dublin, June 26, 1866. By THOMAS ARMETRIDGING COMPTON, M. D.; B. A. Corpus Christi College, Cambridge, &c. &c. &c. 8vo. pp. 22, with 9 diagrams. London: John Churchill & Sons, 1866.

THE indefatigable labours of Prof. Wunderlich, of Leipsic, with the clinical thermometer and the admirable papers by Drs. Aitken, and Sidney Ringer, have attracted much attention recently, to the value of that instrument in diagnosis and prognosis in certain diseases.

Dr. Compton has investigated this subject with much industry, and his results are of great practical interest. His thesis is divided into two parts. In the *first* he treats of the practical value of accurate daily observations on the temperature of the body in acute diseases; the *second* is devoted to the consideration of the course of temperature and pulse in typhus and typhoid fevers, and some of the points of difference between these two fevers shown thereby.

Dr. C.'s general conclusions have been arrived at, after a careful study of some 125 cases taken by himself during two years at St. Bartholomew's hospital, and also of seventy-five others taken in the same hospital by Dr. Warter. The total number of cases in which the temperature and general symptoms have been watched and recorded daily throughout their course, amounts to 200, of which sixty are typhus, thirty typhoid, twenty pneumonia, fifteen scarlet fever, and the remaining seventy-five comprise cases of febricula, acute rheumatism, erysipelas, chorea, acute tuberculosis, &c. The total number of observations in these cases, and in others in which only one temperature has been recorded by Dr. Warter or himself, probably exceeds 5,000.

The observations on temperature were taken with the thermometer in the axilla once daily, but always at nearly the same hour—about two o'clock P. M., at the same time noting the state of the pulse, skin, respiration and general symptoms.

In speaking of normal and abnormal temperatures, Dr. C. states that he considers the approximately normal temperature of the axilla in a healthy adult to range between $95^{\circ}.5$ and $98^{\circ}.5$ Fahr., the most common temperature being probably $97^{\circ}.4$ Fahr., which is one degree less than that usually considered as the normal one.

The propositions which Dr. C. wishes to establish are the following:—

“1st. That a continued daily temperature of 99° Fahr., and upwards, indicates an unhealthy condition, and occurs in every case of acute disease. As I have never met with one case in which such a temperature was present, under normal conditions, in a healthy adult, and as every case of the 200 taken exhibits this state of temperature, the proposition may be considered to be proved.

“2d. That any one observation of a very high temperature (such as 105° Fahr.), in any case in which the general symptoms do not appear of any particular severity, should lead to a very attentive re-examination, and suggest a very careful watching, especially if occurring in a non-diagnosed case; such a temperature being present only in severe forms of any disease.

“3d. That the thermometer is of great use, as a means of diagnosis in those cases, which frequently present themselves, of general *malaise*, often accompanied by a history of rigors, loss of sleep, &c.; such symptoms being due either to the commencement of some acute disease, or merely to some gastric or uterine disturbance of a temporary character.

“In these cases it is often at first impossible to decide, judging only from the pulse and general symptoms; but if the state of the patient be due to the more serious cause, we shall invariably find an abnormal temperature; and on the other hand, if due to any other, a normal temperature, will be often met with, frequently accompanied by a very rapid pulse. I have never met with one case in which, the temperature being normal, any acute disease afterwards developed itself.

“4th. That the temperature in every disease has a tendency to run a peculiar course, and has a certain range of altitude, a knowledge of which course and range is of great value as an assistance to us in diagnosis and prognosis.

“In connection with this proposition I should observe that I have not found the temperature in acute disease to be perceptibly affected by the season of the year, at which the disease may have occurred, although the temperature of the wards during the year has varied to a considerable extent.

“Again, if cases of similar severity at different ages be compared, the altitude attained by the temperature in any disease does not appear to be influenced by the age of the patient, although ‘the normal’ is generally reached somewhat earlier in children than adults.

“5th. From the last proposition it follows, that the same altitude of the thermometer attained at one period of any disease is not of the same importance as the same height reached at another time in the same disease.

" Thus, in typhoid fever, a temperature which has been rising for two or three days, reaches perhaps 104° Fah. between the seventh and fourteenth days, without causing any anxiety; whereas should the same phenomenon occur about the twenty-eighth day, a fatal termination might probably be expected.

" And again, the actual altitude attained on a certain day in one disease is not of the same importance to our prognosis as the same height reached on the same day in another disease. Thus, a temperature of 104° Fah. in erysipelas is very common during the first week, and need not give rise to any alarm; but should such occur at the same date in acute rheumatism I should consider it of much more importance.

" 6th. That although, in all diseases, a high range of temperature generally indicates a severe case, with a slow convalescence, and a low range usually occurs in a mild case, and is followed by a rapid convalescence; yet there is no actual temperature in any disease which necessarily foretells a fatal termination. Thus I have registered 105.6 Fah. in a severe case of typhus ending favourably, 106.3 Fah. in erysipelas, 105.3 in typhoid; and each of these temperatures was the highest I ever took in the respective diseases.

" I certainly once registered a temperature of 107.2 Fah. in a fatal case of pneumonia; but the great majority of fatal cases generally, although always exhibiting abnormal temperatures prior to collapse, have by no means had any extraordinarily high ranges. I believe that an abnormal course of temperature is more often the precursor of a fatal termination than any universally high range.

" 7th. That in the majority of cases a rise of temperature is contemporary with a rise of pulse, but that on the other hand there appears generally to be but little connection between temperature and frequency of respirations.

" The alteration in the pulse with a change of temperature is often not a proportional one, and may not take place at all unless the variation of temperature be as much as 2° Fah.

" 8th. That where the temperature and pulse together do not coincide with the general symptoms, the two former may be generally relied on as to the actual state.

" 9th. That where the temperature and general symptoms agree together, but do not coincide with the state of the pulse, the two former may generally be relied on as to the actual state.

" Thus in cases of hysteria, and in cases of excitable persons approaching convalescence after fever, we often suddenly get a very high pulse, which is sometimes continuous for days, although the temperature and general symptoms are neither of them adverse.

" 10th. That in those cases in which the pulse and general symptoms remain the same, a moderate fall of temperature on one occasion is not to be relied on; but should such a fall continue in a moderate and gradual manner, for some days, and at such a period when a fall was to have been expected, the temperature may then be depended upon. Severe cases of typhus, towards their close, often give examples of this sort.

" In those cases, however, in which the pulse continues frequent, and the general symptoms are severe and without improvement, a considerable fall of temperature, say 5° or 6° Fah. is to be regarded with anxiety, being probably due to some internal hemorrhage, or to the commencement of a state of collapse.

" 11th. That in those cases in which the pulse and general symptoms continue the same, being the one frequent and the other severe, a continuous rise of temperature for some days, occurring at a period of disease at which some improvement might generally be expected, is usually the precursor of a fatal termination.

" Thus, in a case of typhoid fever, terminating fatally on the thirty-sixth day, the pulse and general symptoms continued without change until the thirty-fifth day; the former having stood at 92 on the twenty-ninth day, remained steady and rather below that frequency until the thirty-fifth day, when it suddenly rose to 124. The temperature, however, rose continuously from the twenty-ninth day, nearly a degree a day, until it stood 5° higher on the thirty-fifth than on the twenty-ninth day—the height registered on the thirty-fifth day being 104° Fah.

"12th. That although it is possible that the state of the temperature alone in acute disease may, perhaps, hereafter prove to be the one safest symptom to rely upon if taken by itself (and I believe it is at present, at least, equal to the state of the pulse, and of greater value than this certainly, if only its frequency be taken into account), yet the temperature must be considered merely as an aid, and all other symptoms must be carefully examined into, as it is on comparison with these that its greatest value is always to be found."

Dr. C. sums up the differences most frequently observed between typhus and typhoid fevers, so far as their pulses and temperatures are concerned, as follows:—

"1st. The maximum temperature attained during the course of either disease, about 2 P. M., is somewhat lower in typhoid than in typhus fever, but a continuous abnormal temperature is of much longer duration in the former than in the latter.

"2d. The defervescence of typhus is regular and continuous, the temperature falling generally about a degree a day, until the normal is reached; whereas in typhoid, the fluctuations from day to day are considerable, and the fall is not a continuous one daily.

"3d. There is a great tendency in typhus to attain certain temperatures, and to reach certain points in its course, on certain fixed days. Thus, in the great majority of all cases, a temperature of about 104° Fah. is met with on the seventh day; in a very large percentage the maximum is reached on the seventh or eighth days; 'the normal' is generally attained, in mild cases, on the twelfth or thirteenth days; and in more severe ones between the fifteenth and eighteenth days.

"In *typhoid* there is no particular temperature generally arrived at on any one day; the maximum may be reached at any time between the seventh and twenty-first days; and 'normal' is attained, in mild cases, between the fifteenth and twenty-first days; whilst, in the more severe ones, it may be attained on any day between the twenty-fourth and thirty-fifth.

"4th. The pulse is generally less frequent in typhoid; and although in both fevers the pulse usually fluctuates with the temperature (about five beats of pulse corresponding to each degree of alteration in temperature), the frequency of the pulse in the two, for the same degree of altitude, is different.

"Thus, with a temperature of 100°·5 Fah., we generally find an average pulse, of about 105 in typhus, but of only 95 in typhoid, and so on; at each degree the pulse being about ten beats more frequent in typhus than in typhoid. Moreover we sometimes meet with a case of typhoid fever in which the pulse very slightly exceeds 'the normal' throughout, but such a case I have not observed in typhus.

"5th. In typhus the temperature reaches normal two or three days before the pulse, and the general symptoms often continue severe several days after the pulse and temperature are both normal. In these cases, however, if the defervescence has been regular, and has occurred about the usual period, the case will terminate favourably, notwithstanding the often very unfavourable condition of the patient.

In typhoid, on the other hand, as I have before mentioned, the temperature keeps up several days after the general symptoms have been considerably improved, and we must look, with doubt rather than otherwise, on cases in which this rule appears about to be broken—that is, on cases in which the general symptoms continue severe, although the temperature is but little, if any, above 'the normal.'

"6th. Relapses of typhoid have occurred in 12 per cent. of all cases, and in these the temperature ran a somewhat similar course as in the former attack, although 'the normal' was attained at an earlier date.

"Relapses of typhus, with a corresponding recurrence of abnormal temperature, have never been met with, although the number of cases of typhus under observation has been double that of typhoid."

Appended to this brochure are nine diagrams, showing the variation on different days of the temperature, pulse, and respiration in cases of pneumonia, acute rheumatism, facial erysipelas, tonsillitis, scarlet fever, mild and severe form of typhus fever, mild and severe form of typhoid fever.

ART. XXIII.—*Sobre Alguns Symptomas da Diabete. Lição Clínica Feita na Escola de Medicina de Lisboa.* Pelo Dr. ABEL JORDÃO, Lente na Mesma Escola. 12mo. pp. 13. Lisboa, 1866.

On some Symptoms of Diabetes; a Clinical Lecture delivered in the Medical School of Lisbon. By Dr. ABEL JORDÃO, a Professor in the School.

WE propose to lay before our readers a brief summary of this interesting lecture. Perpetua dos Santos, aged 24 years, the subject of this case, presents some symptoms worthy of especial notice, since little or nothing in regard to them is known. The patient having suffered some time from intermittent fever, immediately after the disappearance of the attack observed that appetite and thirst, until then normal, became excessively augmented. Diabetes followed the attack of intermittent.

Dr. Jordão says that this is not the first case in which he has seen diabetes developed after intermittent. In three patients he has verified this etiology of the complaint, and he refers to the *Acta erud Lipsiæ* of 1696, in which will be found a similar case reported by Scaramuci. There is then, he conceives, a relation of causality between these two morbid conditions, and that this is farther confirmed by physiological experiments.

During (Dr. J. says) attacks of intermittent, and following them, Mr. Bourdel de Vierzon observed the presence of sugar in small quantity in the urine, and he asks, "Why does such a symptom appear in intermittents?" The explanation is, according to Dr. J., easy, conceiving that intermittent attacks are irritations of the sympathetic nerve, followed by its unavoidable paresis. During its paroxysms there is hepatic congestion, similar to that which obtains from paralysis of the sympathetic in physiological experiments. In the experiments the appearance of glycosuria is constant; what wonder, then, that the same happens in the pathological case? Doubtless the mode in which these two phenomena are produced, are identical. Physiological experiments, compared with morbid facts, give us the key to the etiology of certain diseases. Formerly the case was inexplicable; now, according to our author, its explanation is found in the progress of physiology. In intermittents the sympathetic is paralyzed; the same occurs in diabetes. In the first the phenomenon is temporary, in the second almost continuous; in both cases sugar appears in the urine—in one temporarily, in the other continuously. Intermittent, if we may be allowed the term, is the microscopic *photograph* of diabetes.

If these reflections are not sufficient to produce conviction, regard the third case of my clinic, in which diabetes was consecutive to intermittent.

Let us now (says Dr. J.) examine some of the symptoms. Early in the disease the patient, besides attacks of hæmorrhoids from which he then suffered, complained of having lost blood by the rectum months after the appearance of diabetes. These rectal hæmorrhages often depend on hæmorrhoids; at other times they seem to be essential. The first condition is that of our patient. If we had not scrupulously observed this symptom, as we have in different diabetics, we might say, as all physicians do, that the diabetes in the present case was the result of suppression of the rectal hæmorrhage. The ancients had observed the fact, as we have done, but they neither verified nor appreciated it. I have seen individuals with the appearance of good health, suffer from rectorrhagia, in whom, subsequently, the hæmorrhage being suppressed, decided symptoms of diabetes appeared, and hence the effect was attributed to this cause. This occurrence is sufficiently frequent, but, since in very rare instances of diabetes it is absent, it is believed its true interpretation is other than that accepted up to the present time.

Physicians who place rectorrhagia in the etiology of diabetes are deceived, because they are not aware that the appearance of good health and fatness are almost always present in the first period of the disease. They therefore think that diabetes is not the cause of the hæmorrhage, and that the latter precedes it. I repeat, then, that diabetes is anterior to this symptom, which is an effect, and not a cause of the disease.

Besides the cases in which this phenomenon is a consequence of hæmorrhoids as in the present instance, there are others of true enterorrhagias which I call *essential*, in opposition to those I have indicated. I do not know that they are in fact essential; it is possible, and perhaps even probable, that they proceed from varicose dilatation of the intestinal veins. I do not attach much importance to this term. The idea which may be formed in this respect is, that in this disease there is a hemorrhagic tendency, and that the obstruction of the circulation through the liver facilitates these varicose dilatations of the intestinal veins, as happens in the gouty, who almost always suffer from hæmorrhoids. As these dilatations form in the inferior extremity of the rectum, or higher up, we have the two species of rectorrhagias. It is proper to say, however, that in rare cases I believe that the hemorrhagic diathesis alone will explain the fact. This tendency to hemorrhage really exists, I judge, only in the first period of the disease.

I have seen two instances of epistaxis in the beginning of the affection. Messrs. Kunkler (*Union Méd.*, 1861, p. 137) and Leudet also mention two cases; and Frank reports a case in which is pointed out the frequency of the phenomenon *before the recognition* of the disease—that is, at a period when the existence of the diabetes might be supposed, since, when it comes to be diagnosed, it is already much advanced.

There are other phenomena in the early stages of diabetes, which also prove the presence of the diathesis. The facility with which blood flows from the gums in consequence of any mechanical irritation—as, for example, the removal of teeth; the taste of blood, almost always accompanied by a light, rose-coloured saliva, which diabetics experience on rising; sanguinolent pustules which appear on the skin, as observed by Marchal de Calvi (*Moniteur des Hôpitaux*, Sept. 8, 1853), and the slight sub-epidermic hemorrhages noted in different parts of the body, chiefly in the hands and arms, are more than sufficient proofs. This last circumstance is not noted by authors, but it is certain that beneath the epidermis small, isolated, rose-coloured spots, of two or three millimetres in diameter, may be seen, in which there are small varicose vessels, and around them extravasated blood; in time these spots become yellow, leaving the vessels perceptible, and finally they disappear, leaving the vessels still visible for a period.

At times hemorrhages are observed in the retina. Messrs. Follin and Lècorchè suppose that they are manifest only when diabetes is complicated with albuminuria, but our distinguished ophthalmologist, M. Mendes, has seen a diabetic with this lesion, who was free from albuminuria.

I insist upon this relation between rectal hemorrhages and the particular hemorrhagic diathesis in diabetes, because I believe I am the first to point it out. I have alluded to the healthy and plump aspect of diabetics in the first stage of the complaint; and now is a fitting occasion to say something in relation to it. Our patient seems not to verify this statement; nevertheless I think proper to discuss the point to enable you to avoid many errors of diagnosis. When diabetes is chronic in its progress, diabetics grow fat, and the reason of the phenomenon is easily understood. When we wish to fatten an animal, we give it feculent and sweet substances in abundance. Through such means we succeed, in proper time, in fattening domestic animals—the hog, for example. The same occurs in the diabetic, who, in the beginning, has an excess of sugar and carbonaceous substances in the blood, which the organism cannot burn, but is still able to convert into fat. This fact has given rise to an error on the part of Messrs. Landouzy and Marchal de Calvi. These distinguished physicians suppose that the *robust, fat* constitution, is a cause of diabetes; but, I think, erroneously. A robust, adipose constitution is not a cause, but an effect of the complaint. I have seen some cases of lean individuals attacked with diabetes, who commenced to fatten, and in a short time presented a fair aspect of health. During the first period of diabetes, patients entirely deprived of feculents become lean, but on allowing them a moderate use of these substances, they again acquire fat.

These ideas, which I presented in 1864, have just been confirmed by Mr. Harley, of London. This aspect of health in such patients often diverts the

attention of the practitioner; therefore it is always prudent to examine the urine of individuals who are in this condition, and at the same time complain of want of strength inconsistent with their good appearance.

Observe the leanness of this patient, chiefly of the arms and belly. You see there is no relation between the leanness of the arm and of the forearm, nor between the belly and the rest of the body. In these regions there is muscular atrophy; in the arm you almost touch the humerus, but in the forearm the muscles are distinctly felt; in the belly the intestines are beneath the fingers, and, if attentively observed, their outline may be perceived through the abdominal parietes by their peristaltic motions. In this case there is not only an absence of fat, but also a want of muscular resistance to palpation. Although I have often observed this symptom, I find it nowhere noticed.

The intellectual lesions in this patient are quite curious. Perpetua dos Santos is extremely impatient—almost insupportable; weeps readily; often imagines that they seek to kill him, or that he is about to die; at intervals is truly delirious, destroying the bedding, having, on these occasions, tonic convulsions; at times vertigo is also manifest. These vertigos are not rare; Frank and others speak of them. The lesions of intelligence presented by this patient are characteristic, and sooner or later almost all diabetics are affected by them. Memory diminishes, cheerfulness is almost always lost, and individuals become sad and apathetic. I have seen many such instances. Irascibility is common; hallucinations and delirium, as seen in this patient, are more rare.

This case presents many and various nervous phenomena, neuralgic pains of the nucha and teeth, rheumatoid neuralgic pains of limbs. Neuralgias are most frequent in the intercostal and sciatic nerves, but, in my opinion, the first are most frequent. A diabetic manifestation observed in this case is furuncles.

W. S. W. R.

ART. XXIV.—*A Treatise on Emotional Disorders of the Sympathetic System of Nerves.* By WILLIAM MURRAY, M. D., M. R. C. P. Lond., etc. etc. 8vo. pp. 118. London, 1866.

THIS is quite an interesting essay, and on a subject of no slight importance, whether considered in its relations to the prophylaxis of a very large class of diseases of every-day occurrence, or to the elucidation of their symptomatology and therapeutics when present.

The influence, either for good or for evil, that is exercised upon the different parts of the human organism by the emotions, passions, appetites, and desires, and the influence, on the other hand, which even slight abnormal conditions of the several organs exert over the emotions, appetites, and desires, has been recognized even by the non-professional observer, while it is a fact of which every intelligent physician is fully cognizant.

The influence exercised upon the emotions by disturbed states of the viscera is less patent to the public generally than is the influence exercised by the emotions upon the healthful play of the proper functions of the individual organs. From an ignorance of how much of mental suffering, of irregularity of temper and of eccentricity of character, is directly due to disordered conditions of those portions of the organism which are most under the dominion of the ganglionic system of nerves, the non-professional observer is constantly led into errors of judgment, too often attended by results the most mischievous.

While the great body of the medical profession are perfectly familiar with those disorders which usually accompany too violent, or otherwise disturbed conditions of the mind, but few of its members understand aright the manner—the physiological relationship by which this connection between mental disturbance and visceral disease is brought about. To explain the nature and the mechanism of such connection; to show that it is the result of a relation exist-

ing between the emotions and the diseased viscera, through the medium of the sympathetic system of nerves, is the leading object of the work before us.

The author has, it is true, attempted scarcely more than to furnish a mere leading outline of the subject. So far as it goes, however, the exposition of Dr. Murray is replete with interest. Pursuing a correct and well-defined line of investigation, he has prepared the way for a fuller and more complete examination of the subject. The more it is examined, the more important it will be found, whether viewed in reference to its medical bearings, or to its connection with the well-being and happiness of man.

Upon the effects which are exercised by emotions upon the cerebro-spinal system of nerves, Dr. M. has only touched slightly. His leading object throughout has been to select the phenomena which tend most to establish the position that the emotions affect the viscera, and the viscera the emotions, through the sympathetic system of nerves.

"To mark distinctly," he observes (Pref., p. vii.), "the line which separates the phenomena which are cerebro-spinal from those which are sympathetic is impossible. As, however, some broad distinctions can now be drawn between the functions of these two divisions of the nervous system, the time has arrived when we ought to avail ourselves of this knowledge in studying emotional disorders, so as to determine those conditions of the mind and body which attach themselves to the one or to the other system of nerves."

The treatise of Dr. M. is arranged in two sections. The first being devoted to a brief consideration of the physiology of the subject, and a general review of the influence exerted by the emotions upon the organs of the living body, through the medium of the sympathetic system of nerves; while, in the second part is presented a sketch of emotional diseases; in other words, of the "various mental effects produced by a diseased or exhausted condition of the visceral system of nerves, and the lesions of the viscera which lead to these morbid conditions of the nerves," followed by a chapter upon the prevention and treatment of these lesions.

Dr. M. has not attempted any elaborate classification of the emotions. After a careful effort, he found that it was not easy to allot to any one of the emotions, a series of effects sufficiently special and distinct to enable him to identify it by its action on the living organism. He has, consequently, indicated the character of the emotions under two heads. The first embracing those whose effects are pleasurable and beneficial. In the second, are included those emotions, the effects of which are painful and injurious. He has not, on this account, distinguished with much nicety between appetites, desires, emotions, passions, etc., each of these being held to be a variety of that flow of nervous force which is continually moving throughout the visceral regions of the body. Throughout, the terms expressive of the emotions are used in the sense popularly attached to them. This has been done, Dr. M. remarks, with the view of appealing to the common sense and experience of the reader, at the risk of incurring the severe criticism of the precise psychologist.

The emotional affections noticed in the second part of the treatise are, 1st. Those of the digestive organs, with a brief notice of hypochondriasis—imaginary diseases, etc. 2d. Those of the generative organs, including a sketch of nymphomania, masturbation, hysteria, miscarriage, etc.

The short chapter on treatment is replete with useful hints. It is far too concise, however, and too general in its teachings, to serve as a useful and satisfactory exposition of the therapeutical management of so large and important a class of diseases as are those attended with emotional distress.

We recommend the entire treatise to the notice of the American physician. From a careful perusal of it many a valuable hint will be derived—the development of which, by careful and repeated observation, cannot fail to supply an important want in our knowledge of the etiology and true character of many affections vaguely denominated nervous.

As a fitting close to this notice of a work which, short as it is, has interested us much, we present the following summary of the author's teachings in his own words:—

"*Proposition I.* The emotions injure the body most commonly by their effects
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upon the viscera, through the sympathetic system of nerves. *Proved, a.* By comparing the action of emotion on bloodvessels, non-striped muscles, and glands in *external* parts, with the established functions of the sympathetic nerves supplied to these parts, the two are found to be identical. *b.* Effects which cannot be produced by volition of cerebro-spinal nerves in these parts, are easily produced by emotion and sympathetic nerves; therefore, emotions act on those parts through the sympathetic system. *c.* Symptoms occur during the prevalence of strong emotion which indicate alterations in the internal viscera, similar to those which occur in external parts, viz., changes in the vascularity, secretions, and muscular actions of those viscera which are largely supplied by sympathetic nerves; therefore, from the nature of the effects produced, and from the relation of the parts acted on to the sympathetic system, it appears that emotion acts on these parts through the sympathetic system.

Proposition II. There are disordered states of the viscera which powerfully induce those emotions which are injurious to the body. These effects are produced through simultaneous disorder of the sympathetic system. *Proved, a.* There are always accompanying depression of spirits, symptoms which depend upon disordered action of the sympathetic system. *c. g.* 'the flushings of the change of life.' *b.* Morbid emotional sensations are always referred to those regions where the great sympathetic centres lie. *c.* The capability of a diseased organ to excite these emotions is in proportion to the supply of nerves from the sympathetic system. *d.* Treatment which addresses itself to the sympathetic system, and seeks to relieve it. *c. g.* the application of compresses on the site of the solar plexus, is undoubtedly successful in dispelling morbid emotion. *e.* The above sequence of events cannot be accounted for by disturbance of the cerebro-spinal system only. We are, therefore, driven to the conclusion that, as the medium of communication between the cerebro-spinal system and the viscera, the sympathetic system also becomes the tract through which emotion finds its way to the viscera; and, conversely, it is the channel by which the viscera influence the emotions. When the sympathetic system itself is out of order, the emotions suffer with it." D. F. C.

ART. XXV.—*A Treatise on the Principles and Practice of Medicine, designed for the Use of Practitioners and Students of Medicine.* By AUSTIN FLINT, M. D., Professor of the Principles and Practice of Medicine in the Bellevue Hospital College, &c. Second edition, revised and enlarged. 8vo, pp. 967. Philad.: Henry C. Lea, 1867.

THE extended Review of the first edition of this work which we published only nine months ago, renders a detailed account of the present issue unnecessary. It is evident that the judgment we pronounced has been ratified by the medical profession. Perhaps it would have been well had the author been allowed a longer time to weigh the suggestions made by his own reflections and by the Medical Press, before he issued the work a second time. But the exigencies of publishers are not always in accord with the judgments and desires of authors; the favouring popular wind which determines the former to spread all his sail, more frequently inspires the latter with a desire to trim his vessel as perfectly as possible, so as to make his voyage safe in its issue, as well as swift in its performance.

The present edition of Dr. Flint's Treatise differs from the first by the insertion of new matter more than by a correction of the old. Yet that the latter has not been entirely overlooked, the following quotation from the Preface will demonstrate. "The portion treating of Pyæmia has been rewritten; three affections, omitted in the first edition, have been introduced, viz., Pertussis, General Cerebral Paralysis, and Polyuria; Epidemic Cholera has been considered at greater length; the thermometric phenomena of disease have received fuller consideration, and, in connection with many affections, there has been added new matter,

much of which relates to special therapeutics." It may be judged how substantial these additions are when we state that they amount, in all, to one hundred pages.

We are happy in being able once more to commend this work to the students and practitioners of medicine who seek for accurate information conveyed in language at once clear, precise, and expressive.

A. S.

ART. XXVI.—*Injuries of the Spine. With an Analysis of nearly Four Hundred Cases.* By JOHN ASHHURST, Jr., M. D. 12mo. pp. 127. Philadelphia: J. B. Lippincott & Co., 1867.

FRACTURES and luxations of the spine are, as must be conceded by every surgeon, exceedingly difficult of diagnosis, uncertain of prognosis, and most embarrassing in their treatment.

This is owing, to some extent, to the very nature of such injuries; but a great deal is also due to the necessary imperfection of individual, and the extreme meagreness of accumulated, experience. To these injuries the first aphorism of Hippocrates has been always especially applicable: opportunity passes quickly, experience is hard to seize, and judgment difficult.

To show the rarity of such cases, we will notice that Malgaigne, whose researches were very extensive, collected only forty-five cases of luxations of every kind in the cervical region, and thirteen in the dorsal-lumbar. Of fractures, he says, they are very rare; but fourteen cases were observed at the Hôtel-Dieu in eleven years. At the Middlesex Hospital, according to Lonsdale, out of 1901 fractures treated during six years, only eight were of the vertebræ; and, at the Pennsylvania Hospital, the author of the work now before us found that in nearly 4000 cases treated during fourteen years, the vertebræ were affected in but twenty-four.

In this volume Dr. Ashhurst has presented to us the accumulated experience of the profession in this obscure class of injuries. By most laborious and well-directed research he has succeeded in collecting as many as three hundred and ninety-four recorded cases. These statistics are nearly complete, and whatever may be objected to statistical arguments, it is unquestionably true that statistics of this kind are but accumulated experience, and that in this way are we best taught. *Experientia docet.*

This great experience has been applied by Dr. Ashhurst with remarkable ability and success in setting forth the nature, causes, pathological conditions, and the physical and rational symptoms of these injuries, their prognosis, and the results of different modes of treatment.

As a general rule, and indeed so far as was practicable or advisable, this has been done by means of tables, the construction of which must have demanded great labour. For treatment, which the author desired particularly to elucidate, four tables are given; the first gives a view of the treatment employed; the second, an analysis of the nature of the injuries, as regards results; the third, an analysis of the results, as regards the treatment employed; and the fourth, a comparison of the results of various modes of treatment for each region.

It is thus clearly manifest that the mortality in these injuries has been almost three times as great when general treatment only has been practised, as when attempts at reduction were made, and moreover the final result when the patient survived was less satisfactory. After resection, the proportion of deaths was nearly six per centum greater than when general treatment was adopted, and in those cases that survived, the proportion of recoveries was far less—by recovery meaning that the patient was sufficiently restored to pursue some occupation. In fact, there is not, so far, one well-authenticated instance of recovery after spinal resection.

The following are the conclusions which Dr. Ashhurst believes justifiable from

the facts brought forward. We agree with him in every one, except that in the third we would add, "and paraplegia exists," to "one or more vertebrae have been displaced."

"1. Injuries of the spine are not nearly so fatal as is generally supposed, and they have been, not unfrequently, completely recovered from.

"2. By watching carefully the symptoms and knowing the lesions which they indicate, the patient's progress towards health or death can be pretty accurately foreseen in most cases.

"3. Whenever there is reason to believe that one or more vertebrae have been displaced, extension should be employed: temporary, if that be sufficient, if not, continuous.

"4. In no case do resection or trephining offer a reasonable prospect of improving the patient's condition, but, on the contrary, there is reason to fear that they would increase the chances of a fatal termination.

"5. Those cases of spinal injury which are not adapted for the employment of extension, should be treated in accordance with ordinary rational and physiological principles.

"6. No new mode of treatment is entitled to adoption in a class of injuries so serious as this, unless it can be shown by clinical experience that it is at any rate *not less successful* than the modes commended to us alike by reason and long experience."

All the cases collected by Dr. Ashhurst he has arranged in tabular form in an appendix, under the different headings of Age, Occupation, &c.; Mode of Injury; Description of Injury; Progress of Case, &c.; Time under Observation; Result; Remarks; Autopsy, &c.; Author; and Reference. This table is a monument of surgical research, and will prove of invaluable assistance to all future investigators in this not too well-known region of surgery. This small volume—*non multa, sed multum*—is very neatly printed.

W. F. A.

ART. XXVII.—*Inhalations in the Treatment of Diseases of the Respiratory Passages, particularly as effected by the Use of Atomized Fluids.* By J. M. DA COSTA, M.D., Physician to the Pennsylvania Hospital, &c. &c. 12mo. pp. 86. Philadelphia: J. B. Lippincott & Co., 1867.

This volume is very interesting, containing as it does the expression of the personal experience of a very careful observer—for such the author is—in regard to the therapeutic value of the inhalation of atomized fluids in certain diseases. The author began this inquiry, he states, "in the spirit simply of examining the value of the plan as a clinical problem," and has satisfied himself "of its use in some disorders, and its futility in others."

He treats in separate chapters: 1st. Of the history of inhalations and the apparatus employed. This chapter is copiously illustrated with figures of the various apparatus usually employed. 2d. The mode of administering inhalations. 3d. The penetrability of atomized fluids into the air-passages. 4th. Doses of medicine for inhalation. 5th. Therapeutic considerations.

The following are the conclusions of the author:—

"1. That inhalations by means of atomized fluids are an unquestionable addition to our therapeutic means; but that they are nothing but an addition, and not a substitute for all other treatment; that therefore their claims to be so considered are unfounded.

"2. That in most acute diseases of the larynx, and still more so in acute disorders of the lungs, their value, save in so far as those of water, may tend to relieve the sense of distress, &c., and aid expectoration, is very doubtful; though in some acute affections, such as in oedema of the glottis and in croup, medicated inhalations have claims to consideration.

"3. That in certain chronic morbid states of the larynx, particularly those of a catarrhal kind, and in chronic bronchitis, they have proved themselves of

value; but that they are useless or next to useless in ulcerated diseases of the larynx.

4. That in the earlier stages of phthisis they may be of decided advantage, and that at any stage they may efficiently aid in treating the symptoms of this malady; but that they are valueless to stay the disease after softening has fairly set in.

5. That their influence on such affections as whooping-cough and asthma is not satisfactorily proven.

6. That they furnish an unexpected augmentation of our resources in the treatment of pulmonary hemorrhage.

7. That the question in any disease of the respiratory tract is not whether the atomized fluids can reach the seat of the malady, but whether they can do so in sufficient quantity and in a manner to become available as a therapeutic means.

8. That in estimating the actions of inhalations of atomized fluids, we must accord due value to the ready absorption of many through the pulmonary structures, and guard against attributing to a local influence what may be due to the constitutional effect of the remedy.

9. That we cannot overlook the part the watery vapour plays when using atomized solutions.

10. That they require much care in their employ, and that particularly in acute affections we should consider whether, as they have to be used frequently to be of service, the patient's strength justifies the disturbance or the annoyance their frequent use may be.

11. That in any case, to be of service, the inhalations ought to be carried on as a treatment with a distinct object, and not intermittingly or spasmodically resorted to.

These conclusions and the remarks preceding them apply exclusively to the treatment of the diseases of the respiratory passages by atomized fluids, for though incidentally the inhalation of gases or vapours has been mentioned, it has purposely been no more than alluded to, since this subject has been long before the profession and has been often examined; whereas that of inhalations by means of atomized fluids is a novel one, and one which will require much unbiassed investigation to determine its true position."

ART. XXVIII.—*Education of the Imbecile.*

Fourteenth Annual Report of the Pennsylvania Training School for Feeble-Minded Children for 1866. 8vo. pp. 30. Philadelphia, 1867.

Fifteenth Annual Report of the New York Asylum for Idiots. Transmitted to the Legislature March 9, 1866. 8vo. pp. 70. Albany, 1866.

AMONG the various benevolent institutions which have been organized during the present century, there are none which present stronger claims to our approval than those which have for their object the education of feeble-minded children, and the amelioration of their condition generally.

The considerable percentage of this unfortunate class who, through the training to which they have been subjected in the institutions referred to, have been so far strengthened in mental power as to be able to assume a respectable position in society, and support themselves by their own industry, is of itself sufficient to press upon our attention the asylums and schools for the imbecile. As schools, none others are so well adapted to help the sluggish and clouded reason to the rudiments of English education, to correct perverted morals and disordered fancies, and train the feeble-minded to habits of virtue and usefulness. Even in those cases in which any useful amount of education is found to be impracticable, as asylums for these irreclaimable idiots, the institutions under consideration are valuable in several points of view. By relieving the mother of the care of her helpless, idiotic child, the energies of her mind and body can be the more

fully directed to the proper training and education of her other children, while, at the same time, from the community is removed the presence of individuals who, if not actually dangerous, have often a pernicious influence.

"A very obvious and important reason for the removal of the lower class of idiots or imbeciles from their homes"—we use the language of the Pennsylvania report—"grows out of that principle of imitiveness, by which the similarity of the children of the same family increases the liability to a dangerous imitation or absorption of the frail one, until deterioration is marked upon the natures of all."

The pupils of the Pennsylvania institution are classified according to their dependence, or the degree to which they may arrive in self-support. Adventitious disease or accident may disappoint the hope formed in some cases, while individuals classed as hopelessly dependent, will occasionally arouse from their lethargy, and gain a foothold in a higher grade.

In two classes all the pupils are embraced, 1st. The hopelessly and totally dependent, earning nothing, many of them incapable of attention to their personal wants. 2d. Such as, under advantageous circumstances, may be advanced from varying degrees of dependence to partial, or in some few cases, to entire self support. The second class is divisible into three grades. *a.* Children possessing peculiarities of mind, or deficiency of intellect, disqualifying them for ordinary schools. Simpletons, as they are often called. *b.* Children possessing peculiarities of mind, or deficiency of intellect, accompanied with super-excitement of nervous system and enfeebled *morale*. *c.* Children possessing peculiarities of intellect, complicated with remediable epilepsy.

It has been considered that for the epileptic-imbecile there is no relief. This later experience has shown to be not true. Seguin cites a case of a profound idiocy, complicated with epilepsy, in which the motor disorders and nervous irritability were so regulated by sharp training, that in the sixth month the daily attacks of epilepsy entirely ceased, and the patient from *idiot* became *imbecile*. Several cases of corresponding improvement occurred in the Pennsylvania institution. In the report from the latter it is remarked that there is no positive objection to the admission of epileptics into the institution, on the ground of danger of their contact with the children free from the disease. Only one case of "simulated epilepsy" was met with, and the artifice was so flimsy that it was readily detected, and a proper course of discipline at once corrected the imitator.

In the report from the Pennsylvania institution is the description of a class of children, including many who, when placed under firm control, and a kind, but judicious and steady discipline, are capable of a reform sufficiently complete to render them useful, and even exemplary, members of the community. In the children referred to there is a condition of the nervous system which, if not early recognized by parents, and skilfully treated by a wise domestic discipline, will reduce the possessor to imbecility, or render him a moral scourge in the community. Indeed, there are reasons for believing that some cases now remanded to refuges and prisons as criminals, are fitter subjects for the asylums and training-schools instituted for the feeble-minded, being the victims of a low brain organization, and deranged by inheritance.

D. F. C.

ART. XXIX.—*The Principles of Biology.* By HERBERT SPENCER, author of "The Principles of Psychology," "First Principles," "Illustrations of Progress," and other works. Vol. I. New York: D. Appleton & Co., 1866.

THE author of this work, in our estimation, is one of the most erudite, philosophical, and profound thinkers and writers of the day. In the publication before us he is cultivating a field quite different from those which have rendered him eminent. The manner in which the subject is discussed is particularly attractive to our profession, evincing as it does a thorough knowledge of the general principles of the vital organization and functional operations of both

animal and vegetable life. The aim of the work, of which the present is the first volume, to be followed by another, is to set forth the general truths of biology, as illustrative of and as interpreted by the laws of evolution; the special facts being introduced only so far as is needful for the elucidation of the general truths. In the preface to the American edition, he renders thanks to Prof. Huxley and Dr. Hooker for the supply of information where his own was deficient, though it is very manifest that the general principles and theories enunciated by him are the fruits of his own profound reflections and study.

In Part First, relating to the *Data of Biology*, which embraces an account of the elementary matters of which living structures are composed, and the action and reaction of forces, also of the correspondence between life and its circumstances, and the *Scope of Biology*, the student of nature will find a most elaborate and interesting exposition of the principles governing those most mysterious of the products of creation, *life and growth*.

The chapter on the "Proximate Definition of Life" is a most ingenious attempt to answer that most abstruse question, What is life? with acute and philosophical criticisms upon the efforts of other authors to define its meaning.

In treating of the "Scope of Biology," the extent and nature of the subject-matter is divided thus:—

1. An account of structural phenomena presented by organisms. And this subdivides into—

- a. The structural phenomena presented by individual organisms.
- b. The structural phenomena presented by successions of organisms.

2. An account of the functional phenomena which organisms present. And this, too, admits of subdivisions into—

- a. The functional phenomena of individual organisms.
- b. The functional phenomena of succession of organisms.

3. An account of the actions of structure on function, and the reactions of function on structure. And, like the others, this is divisible into—

- a. The actions and reactions as exhibited in individual organisms.
- b. The actions and reactions as exhibited in successions of organisms.

4. An account of the phenomena attending the production of succession of organisms: in other words, the phenomena of genesis.

In the chapter on "Growth," we have, in the first place, a lucid statement, illustrated by many details, of the wide difference between the various departments of the animal and vegetable kingdoms. Thus, "On looking at the organic kingdoms as a whole, we see that the limits between which growth ranges are very wide apart. At the one extreme we have monads so minute as to be rendered but imperfectly visible by microscopes of the highest power, and at the other extreme we have trees 300 feet high, and animals of 100 feet long. It is true that though in one sense this contrast may be legitimately drawn, yet in another sense it may not; since these largest organisms are made by the combination of units that are individually like the smallest."

After an elaborate discussion of the philosophy of these wide variations, comes the very interesting question, "But why should the growth of every organism be finally arrested? Though the rate of increase may, in each case, be necessarily restricted within a narrow range of variations—though the increment that is possible in a given time cannot exceed a certain amount; yet why should the increments decrease, and finally become insensible? Why should not all organisms, when supplied with sufficient material, continue to grow as long as they live? To find an answer to this question we must first revert to the nature and functions of organic matter."

The several conditions by which the phenomena of growth are governed are lucidly stated and discussed, as are also the numerous other inductions of this most wonderful of all the phenomena of nature.

The subject of "Development," which is often used as synonymous with growth, is herein regarded as *increase of structure*, and not *increase of bulk*; and "Evolution," comprehending growth as well as development, is treated upon occasions when both are implied. In this chapter may be found much that is useful to the profound physiologist, as well as to the general scholar.

The branches of the general subject under the heads of Function, Waste and

Repair, Adaptation, Individuality, Genesis, Heredity, and Variation, occupy several chapters consecutively, and are treated with originality and ability.

There is a species of fascination in the writings of Mr. Spencer, which compensates for the very close attention which is required by the depth of his researches.

We have no hesitation in commending the work to the consideration of even weak-minded superficial thinkers; the idea of its having a tendency to atheism, as has been charged upon it, being purely the fancy of some one unable to "look through nature up to nature's God." J. H. G.

ART. XXX.—*Atlas of Surgical and Topographical Anatomy.*—By B. J. BÉRAUD, Surgeon and Professor to the Maternity Hospital of Paris, &c. &c. Illustrated by one hundred plates, drawn from nature by M. BLOX. Translated by ROBERT THOMAS HULME, M. R. C. S., London. H. Baillière, Royal 8vo. 1866, parts 4, 5, 6 and 7. New York: Baillière Bros.

THESE numbers of Prof. Béraud's beautiful work contain two representations of the submaxillary region, showing the superficial and deep layers; two of the subhyoid region; two of the sterno-mastoid region; three of the region of the neck; one of the supra-clavicular region; a horizontal section of the neck on a level with the fourth cervical vertebra; two views of the dorsal region; one of the costal region; one of the mammary region; one of the region of the sternum; two of the mediastinum (anterior, and posterior); five of the thoracic region, with a transverse section of the chest on a level with the eighth vertebra; four of the lumbo-sacral region; four of the antero-lateral region of the abdomen; six of the cavity of the abdomen; one of the region of the internal iliac fossa; three of the inguino-crural region; eight of the perineal region in the male; two of the anal region; two of the scrotal region; two of the region of the pubis and of the penis, and also an antero-posterior section of the pelvis, including the urethra; section of the male pelvic region, and four views of the ano-perineal region in the female.

Much useful information in relation to pathology and operative surgery of all these regions is pointed out in connection with the explanations of the figures.

We must again strongly recommend this work to the attention of the Profession, not only on account of its beautiful execution, but for the very useful information it furnishes.

ART. XXXI.—*Das Vorkommen der Blattern in dem Herzogthum Nassau in den Jahren 1818 bis 1862. Nach den Akten bearbeitet von Dr. ARNOLD VON FRANQUE.* Privatdocent an der Universität München. Separat Abdruck aus den medicinischen Jahrbüchern für das Herzogthum Nassau, 22 Heft. 8vo. pp. 345. Wiesbaden, 1866.

The History of the Occurrences of Smallpox in the Duchy of Nassau during the years 1818 until 1862. Prepared from Actual Observations by ARNOLD VON FRANQUE, Private Tutor in the University of München. Printed from the Medical Annual of the Duchy of Nassau.

THE account given by the author of the work before us of the occurrences of smallpox in the several departments of the Duchy of Nassau, from 1818 to 1862, is replete with interest and highly instructive. It presents, it is true, no new views in respect to the pathology or treatment of the disease. Its chief interest consists in the positive testimony it furnishes of the entire efficiency of the vaccine infection, when the system is put completely under its influence, as a protection against an attack of smallpox, in nearly every case. That even in

those where it fails to afford entire protection, it disarms the subsequent variolous attack, should one occur, of its severity, shortens its duration, and secures the patient's life, in nearly every instance, from all danger. We find that in many locations, upon the appearance of smallpox, a general vaccination was promptly resorted to in the case of the unprotected, and the further extension of the disease was arrested. In numerous instances, even after the unprotected had been fully exposed to the variolous poison, vaccination either prevented the occurrence in them of an attack of smallpox, or so modified the character of the attack as to deprive it of all malignancy and danger.

By the observations detailed in the work before us is fully sustained the importance of a general plan of revaccination being adopted in locations where the variola makes its appearance. This determines the efficacy of the previous vaccination, and furnishes a test, in those cases in which from idiosyncrasy of constitution there is an insusceptibility to the action of the vaccine virus, or in which its prophylactic powers diminish or become lost with the lapse of time. And in this manner rendering cases of varioloid less liable to occur during the prevalence of smallpox as an endemic or epidemic.

Facts are also deduced to show the deterioration which vaccine virus undergoes after it has passed through, successively, the bodies of a large number of human beings, and the propriety of resorting to the cow, at short intervals, for a supply of that which is fresh and more active.

D. F. C.

ART. XXXII.—*The Renewal of Life. Lectures, chiefly Clinical.* By THOMAS KING CHAMBERS, M. P., Honorary Physician to the H. S. M. the Prince of Wales, and Lecturer on the Practice of Medicine at St. Mary's Hospital, &c. &c. Second American from the fourth London edition. 8vo. pp. 646. Philadelphia: Lindsay & Blakiston, 1866.

On the first appearance of this work, it was fully reviewed in this Journal. (No. for April, 1863), and it was again noticed on the publication of the third edition (No. for July, 1865). In the present edition the author has thoroughly revised the previous one, without, however, making any additions except the very useful one of an index. We cordially recommend Dr. Chambers' lectures to the attention of the profession, being persuaded that they are calculated to awaken inquiry in the right direction, and to afford useful instruction.

ART. XXXIII.—*Erkennung und Behandlung der Prostata-Krankheiten.* Von HENRY THOMPSON, Arzt am Londoner Universitäts-Hospitale, etc. Autorisirte Deutsche Ausgabe. 8vo. pp. 255. Erlangen, 1867.

On the Nature and Treatment of the Diseases of the Prostate. By HENRY THOMPSON, Physician to the London University Hospital, etc. Authorized German edition.

THE excellence of Mr. Thompson's monograph on the pathology and treatment of the several morbid conditions of the prostate gland, induced Dr. Theile, of Weimar, to undertake its translation into German, in order that the practitioners of his native land should have ready access to the highly practical teachings of the author. The translation of Dr. Theile presents a very accurate rendering of the text of the original, without note or commentary. The only changes which occur have been sanctioned by the author. They consist, principally, in the arrangement into ten sections of the several subjects included under the head of "Pathology of the Diseased Conditions of the Prostate," which, in the original, have devoted to them seventeen separate chapters. The

number of the illustrations in the original have been reduced also, by leaving out such of them as, in the estimation of Dr. Theile, throw but little light upon the author's meaning.

D. F. C.

ART. XXXIV.—*An Index of Diseases and their Treatment.* By THOMAS HAWKES TANNER, M. D., F. L. S., etc. 8vo. pp. 397. Philadelphia: Lindsay & Blakiston, 1867.

This index, we are told, was not prepared for the use of the student to instruct him in the nature of "the tools with which he will have to work, and the best mode of employing them." For these the student must seek in other treatises. The work has been prepared solely for the instruction of the practising physician, who, having employed his customary weapons against disease, finds himself baffled.

The physician is to be pitied, but still more the patients of that physician who is so deficient in medical knowledge as to be forced, in his hour of need, to resort for information on any subject connected with the theory or the practice of medicine to a work like the one before us; a work from which, because of the mere outline character of its teachings it is admitted the student would not be able to learn how to distinguish and to manage therapeutically the ailments with which he would be called upon to deal every day at the termination of his novitiate.

All the positive information this "Index of Diseases" is adapted to convey, either to student or practitioner, could be as fully acquired by consulting a proper medical dictionary, such as that, for instance, of Dunglison. D. F. C.

ART. XXXV.—*Extracts from the Records of the Boston Society for Medical Improvement, with Papers read before the Society.* Published in the Boston Medical and Surgical Journal. By the Secretaries of the Society, FRANCIS MINOT, M. D., and CHARLES HOMANS, M. D. Vol. V. 8vo. pp. 559. Boston, 1867.

THE volume before us shows very clearly that the Society from whose records it is made up is, in strict parlance, a working one. The members are manifestly earnest in their desire to contribute to the general fund of medical knowledge whatever facts their respective fields of observation may present, calculated to throw light upon the etiology, pathology, or treatment of disease, or the true character and management of surgical maladies and accidents.

The collection of facts embraced in the volume under notice presents much to interest and instruct. Though, in many instances, their record as isolated observations, collected within a limited and special field, may render them of little value so far as they are calculated to add directly to our medical knowledge, or to increase our professional skill; yet, when they are taken in connection, and carefully collated with other facts from other sources having reference to the same subject, they become of very great value by aiding to establish or refute the views that have been adopted in reference to the nature, course, causation, and management of particular diseases or classes of disease.

Several of the papers included in the "Supplement" to the Extracts are especially interesting, treating, as they do, somewhat in extenso, important points in pathology and practice.

An analysis of the volume would occupy too much space, in consequence of the large number and variety of its contents, and the conciseness with which, in the majority of cases, they are treated. It is to be recollected, also, that they have all appeared in the pages of one of our esteemed contemporaries, to which access can readily be obtained.

D. F. C.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Formation of Cells in Animal Bodies.*—The following is the substance of a communication from E. MONTGOMERY to the Royal Society:—

“The so-called organic ‘cells,’ chiefly those of various cancerous tumours, were seen on the addition of water to expand to several times their original size, and at last to vanish altogether into the surrounding medium.

“The ‘nucleus’ did not always participate in this change, but at times^b remained unaltered, whilst the outer constituents of the ‘cell’ were undergoing this process of expansion.

“This curious phenomenon of extreme dilation is intelligible only on the supposition that the spherical bodies in question are in reality globules of a uniformly viscid material, which by imbibition swells out till at last its viscosity is overcome by the increasing liquefaction.

“In embryonic tissues, and in various tumours, single ‘nuclei’ were seen, each surrounded by a shred of granular matter. On the addition of water there would budge from one of the margins of the granular mass a segment of a clear globule, which continued growing until it had become a full sphere, which ultimately detached itself, and was carried away by the currents. At other times no such separate globule would be emitted but the entire granular shred would itself gradually assume the spherical shape, ultimately encompassing the ‘nucleus,’ and constituting with the same the most perfect typical ‘cell.’

“Not only single ‘nuclei’ were found surrounded by a shred, but also clusters of two, four, and more were seen similarly inclosed by a proportionately large granular mass. Under these circumstances it sometimes occurred that, on the addition of water, the whole granular mass of such a cluster became transformed into a large sphere containing two, four, or more nuclei. The resulting body was to all appearance identical with shapes well known under the name of ‘mother-cells.’ In all these cases the granular shred must have partly consisted of a viscid material, which on imbibition naturally assumed the spherical shape.

“The author then proceeds to his experimental verification. In all the observations cited by the author, the existence of a viscid imbibing material was proved with almost conclusive evidence—a viscid material which is capable of forming globules of a definite size, and while in the living organism actually forms such globules, shapes, the nature of which has hitherto been mistaken. After a long search the substance known under the name of myeline was found to be the desired material. When to myeline, in its dry amorphous state, water is added, slender tubes are seen to shoot forth from all the free margins. These are sometimes wonderfully like nerve tubes in appearance. They are most flexible and plastic. From this curious tendency of shooting forth in a rectilinear direction, it was inferred that a crystallizing force must be at work.

To counteract this tendency, and to oblige the substance to 'crystallize'(!) into globules, it was intimately mixed with white of egg. The result was most perfect. Instead of tubes, splendid clear globules, layer after layer, were formed, resembling closely those of the crystalline lens formed under similar conditions.

"Here was actually found a viscid substance which, on imbibition, formed globules of a definite size. The remaining task was comparatively an easy one. By mixing the myeline with blood-serum, globules were obtained showing the most lively molecular motion. Thus, says the author, 'cells' being merely the physical result of chemical changes, they can no longer afford a last retreat to those specific forces called vital. Physiology must aim at being something more than the study of the functions of a variety of ultimate organic units. And pathology will gain new hopes in considering that it is not really condemned to be the interpreter of the many abnormalities to which the mysterious life of myriads of microscopical individuals seem to be liable."—*Med. Press and Circular*, Feb. 13, 1867.

2. *Development of Connective Tissue*.—Dr. ORDÓÑEZ has thus abridged the results of a prolonged study of this subject:—

1. The stellate corpuscles, called equally plasma-cells and connective-tissue-corpuscles, are not permanent elements properly belonging to fibrillary tissue—connective—but really transitory elements proper to elastic tissue, and in which the existence of a cavity can by no means be demonstrated.

2. The primitive fibrils of fibrillary tissue, called connective, do not possess a central canal, of which there is no means of demonstration.

3. Nor are the elastic fibres channelled.—*Brit. and For. Med.-Chir. Rev.*, Jan. 1867, from *Robin's Journ. de l'Anatomie*, No. 5, 1866.

3. *Lymphatics of the Glans Penis*.—Dr. BELAJEFF investigates this subject as one of particular interest to syphilologists. He says, "The lymphatics of the penis, in man, present a true network of separate closed tubes, the walls of which have an epithelial lining. The chief of these capillary networks extends beneath the *mucous body of Malpighi*, where it forms a layer of numerous ramifications and anastomoses. More deeply, the lymphatic branches become larger and rarer; vertical sections show their very large gaping openings, with an adherent internal epithelial wall; nearer the surface the tubes are, as I have said, thinner, smaller, and forming sometimes meshes in the furrows of the skin, at other times little closed prolongations amongst the papillæ.

The diameter of the largest lymphatics is 1 to 2 mm.; that of the smallest, 0.08 mm. Although this variation of size is considerable, it is yet always less than that of the bloodvessels. As a proper characteristic of the lymphatics, I would mention their dilatations to be observed, either about the middle of the channels or towards their confluence; this dilatation is larger in man than in the rabbit. It may be circular or total, or it may be unilateral. In these lymphatic capillaries it does not indicate the presence of valves, as in the lymphatic trunks; it only bears reference to a simple dilatation.

The single epithelial layer of the capillary tubes consists of oval, polygonal, fusiform, or indented cells. The longitudinal axis of the cells corresponds to that of the vessels. The nearer a capillary tube is to a trunk, the more are its cells compacted and their form is elongated. The terminal meshes, on the contrary, have tolerably large and rounded cells. The flattening of the walls of a transparent tube gives to the cells, under the microscope, a multiform appearance; for the dark lines of the borders of the cells cross reciprocally, and those which belong to one of the walls modify the normal appearance of the cells of the wall beneath it. The average length of the cells is 0.6 to 0.4 mm., and their width is from 0.008 to 0.020 mm. There is greater abundance of lymphatic capillaries throughout the glands and the balano-preputial furrow than in the penis and the prepuce; but the terminal tubes of the prepuce are larger than those of the glands. The epidermis-layer has no lymphatics; they are beneath the mucous body of Malpighi, whilst below them the network of blood-capillaries is very abundant, even to the summit of the papilla.

The lymphatic trunks of the penis have two important characters, without

reckoning their considerable size, viz., the frequency of varicosities which correspond to their valves, and the composition of their walls, which are formed of two or three layers. Above the internal epithelial layer, cells, and annular fibres, accompanied by few cells said to be of the connective tissue, present themselves. The elastic, and, perhaps, muscular fibres, are in the elongated spaces which exist between the rows of transverse or annular cells. Their direction is sometimes rectilinear, sometimes zigzag.—*Ibid.*

4. *Healthy Temperature of the Body, and the Effect of Drugs upon it.*—Dr. J. S. WARTER gives (*Med. T. and Gazette*, Oct. 20, 1866) the results of some experiments made upon himself to determine the healthy temperature of the body and its normal fluctuations; and also the action of dilute hydrocyanic acid, tincture of belladonna, camphor, ether and ammonia, brandy and portwine, on animal heat. The results of his investigations, which can be received only as *probable* truths, being deduced from experiments on a single individual, show "that the normal daily variation in temperature is usually less than two degrees, and that the pulse seems to be more variable than it in proportion, and does not rise or fall necessarily with it.

"That in health there is a gradual elevation in temperature from the time of rising till about 11 or 12 o'clock in the morning, and that the temperature then seems to have a tendency to fall more or less continuously, though each successive meal, after a certain period, seems to raise it again for a given time.

"That violent exercise is a powerful agent in raising for a time the heat of the body, and that hot tea seems to have a decided influence in raising temperature.

"That vascular sedatives reduce the frequency of the pulse long before they influence the temperature, but that it is probable that after a time the temperature also is slightly depressed.

"That alcohol, at any rate, does not cause a depression of temperature, but tends rather to elevate it slightly, and that camphor has probably a decided influence in keeping up the temperature of the body."

5. *Existence of a Perivascular Canal System in the Central Organs of the Nervous System and its Relations to the Lymphatic System.*—His observes (Siebold und Kölliker's *Zeitschrift*, f. *Wiss. Zool.*, xv. 1865) that on examining fine sections of the spinal cord from chromic-acid preparations, &c., it will be constantly found to present fissures which every one must have seen, and which have always been referred to breaking down of the tissue during section. But on attentive examination the fissures will be found to present smooth edges, and to be bordered by a layer of condensed tissue. Their course and division are regular, and the same for all sections made from the same cord. In the white substance they pursue for the most part a radial direction from the gray substance outwards, whilst others commencing at the periphery pass inwards; these are connected by smaller transverse fissures. In the gray substance they are less regularly arranged, are shorter and more angular and closer together, especially at the cervix cornu posterior. They recall the lymph fissures of the testicles and of the intestines. On dipping an injection-needle into a fresh calf's cord, and throwing in some injection, he was immediately successful in filling a canal system, whose arrangement on section exactly corresponded with that of the above-mentioned fissures. The gray substance appeared like a sponge, penetrated by a close network of tubes $\frac{1}{1000}$ to $\frac{1}{600}$ diam., and the same appearances were shown in the human cord. The radial direction was very well shown. The calibre of the chief branches diminishes quickly in passing outwards from the gray substance, but opens into a close and narrow network of canals. The whole closely resembles the root network of the lymphatic system; but we will first consider its relation to the bloodvessels.

Close examination shows that every fissure is traversed by one bloodvessel, sometimes lying close to the wall, sometimes free on both sides, and so on transverse section, each vessel is surrounded by a clear space.¹ Frommann, who has

¹ See also John Dean, *Smithsonian "Contrib. to Knowledge,"* 1864, pl. v., vi., and viii.

seen them, attributes these perivascular spaces to retraction of the tissues. The best mode of displaying them is to inject the bloodvessels in the usual way, and then to inject the spaces by sticking the needle in at random into the texture. The arrangement is also well shown by injecting a nitrate of silver solution either into the vessels or perivascular spaces. All modes of preparation show that the perivascular spaces are constant, and not produced by extravasation nor by collapse of the bloodvessels. The calibre of the spaces is two, three, or even four times greater than that of the contained vessel, and there is no bond of connection between the walls of the vessel and those of the circumscribing space.

Appearances similar to those described above are also to be seen in the brain. The spaces are proportionately larger round the larger vessels than around the smaller. His inquires, What relation does this canal system bear to the lymphatics?

Those accustomed to injections will readily perceive a similarity existing between the perivascular spaces and the lymphatics, and in their size and mode of branching, as well as in the absence of an investing membrane or wall separable from the adjoining tissues, and in the difficulty of exhibiting an epithelial lining. Fohmann and Arnold showed indisputably the presence of lymph-vessels in the pia mater, but no one has succeeded in tracing lymphatics into the substance of the brain. Are the perivascular spaces, then, continuous with the lymphatics of the pia mater?

In answer to this question His shows that the lymphatics of the pia mater can be injected *from* the perivascular spaces of the brain, and the union is effected by a wide lacunar system separating the brain from the pia mater. He believes there is no question that the perivascular spaces are the lymphatics of these parts of the nervous system. He thinks that, on the one hand, these perivascular spaces act as reservoirs for the nutritious fluids, and, on the other, serve as organs protecting these important parts from pressure, serving the same purpose for each individual segment of the nervous system that the liquor cerebrospinalis does for the whole collectively.—*Brit. and For. Med.-Chir. Rev.*, Jan. 1867.

MATERIA MEDICA, GENERAL THERAPEUTICS, AND PHARMACY.

6. *Therapeutic Effects of the Bromide of Potassium*.—Dr. JAMES BEGRIE, in an interesting article (*Edinburgh M. d. Journ.*, Dec. 1866), states that after some years' use of the bromide of potassium he has become satisfied of its great value in the treatment of many diseases, but more especially in disorders of the nervous system, affections of centric origin, or of remote parts through reflex action.

1. He asserts, and this assertion can be confirmed by all who have employed the bromide of potassium, that it is a valuable sedative and hypnotic, and it will often tranquillize when narcotics fail. A dose of from 20 to 30 grains dissolved in wineglassful of water, or of orange-flower water, given at bedtime, repeated in the morning, and persistently employed for days or weeks, will often produce tranquillity in the sleeplessness during convalescence, and after surgical operations.

"2. In those distressing nervous affections, the offspring of overtaxed brain, which we are ever and anon called upon to combat in the case of the earnest student, the plodding man of business, or the speculating merchant, ceases where, by rising early, and sitting up late, neglecting regular hours of diet, and abandoning exercise in the open air, the whole machinery of life and health have been deranged, and the unhappy victims contemplate nothing short of the wreck of mind and body: in these circumstances, next to rigid hygienic rules imposed by the physician, and carefully carried out by the patient, will be found the amelioration and ultimate removal of the evil, in the use of remedies which have

a calmative effect upon the nervous system. Of these the bromides, in my experience, are the safest and the best. * * * Associated with the cerebral disorder of giddiness and sleeplessness, we often find perversion of the external senses, such as rushing, ringing sounds in the ears, etc. These I have found to be quelled and silenced by the use of the bromide, which may be successfully administered in all cases of hyperæsthesia."

3. In that distressing nervous disorder brought on by masturbation he has repeatedly satisfied himself that the remedy in question is a trustworthy agent.

4. In various shades of epileptiform disorder, and even epilepsy itself, resulting from the nervous condition brought on by the practice just alluded to, Dr. B. states that the bromides exercise a powerful influence. Dr. B. has never seen any evil result from its long continuance; the system acquires a tolerance of its employment.

5. In acute mania and delirium tremens he considers that for procuring calmative and sedative effects, the bromide will be found safer than opium, antimony, aconite, and digitalis. "I have seen," he states, "in two recent cases of violent maniacal excitement, a dose of thirty grains of the bromide of potassium, administered every second hour, reduce to quietness the restless subjects, and lay them down in sleep, of which they had for days been deprived. I have not much experience of the remedy in delirium tremens, but I know that it is now on this trial, and I entertain little doubt that it will be successful. In one case its use has been followed by satisfactory results, quickly calming the agitation and excitement, and inducing sleep. In nymphomania, the bromides have been employed with marked success, and Dr. James Struthers informs me that he has obtained most satisfactory results from their administration in puerperal mania. This experience is confirmed by that of other physicians engaged in obstetric practice. In melancholia, attended with fixed delusions and great restlessness, I have found the bromide a powerful calmative."

6. In several affections of the larynx and bronchi, which there is reason to believe have a cerebral origin, or, at least, an intimate connection with the nervous centres, as whooping-cough, laryngismus stridulus, spasmodic croup, and spasmodic asthma, he has found the bromides to possess anæsthetic powers not inferior to any of the narcotics. In spasmodic asthma, Dr. B. has obtained the most satisfactory results from the employment of the bromides. "In two cases of long standing, which had resisted all approved methods of treatment, and where the patients had renounced all hope of benefit from drugs, the use of the bromide of potassium in full doses, night and morning, was followed by a remarkable remission of the fit—the patient in one case having slept for several consecutive nights without the return of the asthmatic paroxysm, a circumstance which had not occurred for years. In the second case the result was equally satisfactory."

7. Dr. B. has found the bromide useful in certain cases of vomiting, and in other affections in which the ganglionic nervous system is disturbed.

8. Considering the nervous element present in diabetes, and the sedative effects on the nerves of the bromide of potassium, Dr. B. was induced to hope for beneficial effects from this salt in that disease, and he briefly relates four cases in which it had been employed. "These cases," he remarks, "sufficiently show that there are forms of diabetes in which the functional derangement of the liver, and the production of sugar, are arrested by an agent whose operation is that of a sedative to the nervous system. It would be premature at the present moment to speculate on the amount of success that may attend the exhibition of the remedy in the varying circumstances in which the disease presents itself."

"9. The phenomena of cholera, in its earlier stages," Dr. B. remarks, "point to its intimate connection with disorder of the ganglionic system of nerves, with irritation of the nerve-centres and vaso-motor nerves, and with spasm of the capillary vessels, and obstructed circulation. To arrest this condition as early as possible seemed a clear indication of treatment; and the bromide of potassium, as possessing decided power in allaying irritation of the nervous system, and of relaxing spasm of the muscular fibre, was proposed by me as a possible means of allaying at least some of the more urgent symptoms of the

disease. It was introduced into practice upon no empirical ground, and with no expectation that it was to be found a cure for the disease. The very first trials of it in the Leith Cholera Hospital were such as to justify the confident hope that it would be found useful; and its subsequent employment there, as well as in the Edinburgh Cholera Hospital, has not disappointed expectation. In the two institutions named, the former under the superintendence of Mr. Niven, the latter under that of Dr. Stevenson Smith, and also in private practice, I have had many opportunities of witnessing its effects, and am now prepared to say that the bromide of potassium, though not possessing the properties of an antidote to the poison of cholera, though not a specific to the shock of this terrible disease, has certainly stript it of some of its terrors."

10. In the treatment of the nervous element in fever we have, Dr. B. says, in the bromide of potassium, an excellent substitute for opium, and antimony, henbane, camphor, and other sedatives. "A sufferer from quotidian ague, after large and repeated doses of quina during the interval, had his regular accession of cold, and hot, and sweating stages unaffected by the specific. The sweating stage was usually protracted and exhausting, and at the end of a fortnight no mitigation was effected. He was advised to take a full dose of the bromide of potassium every three hours during the remission, and, with one imperfect paroxysm, he got quit of his malady."

11. In obstinate cases of neuralgia, which have resisted the usual remedies, "when no palpable or suspected organic mischief gives rise to the want of success in the use of well-tried and approved remedies, and when no constitutional diathesis stands in the way of well-directed skill to overcome: in those anomalous forms of neuralgia let me ask a trial of the bromide of potassium. It will, now and then, in its own gentle way, reprove the employment of the more heroic treatment which had anticipated its use, and demonstrate that a calmative, in such cases, frequently succeeds better than a counter-irritant."

12. Lastly, Dr. B. has tried the bromide in two cases of "exophthalmic goitre" with the effect of calming the system, though without curing the disease.

Dr. B. has used a gargle composed of one ounce of the bromide of potassium in a pint of water in irritable sore throat with marked advantage.

7. *Antiseptic Properties of the Hyposulphites.*—Dr. CONSTANTIN PAUL, who has previously written upon the physiological and therapeutical properties of the sulphites and hyposulphites, contributes to the *Revue de Thérapeutique* two facts relative to the disinfectant properties of the hyposulphites.

First fact:—A patient suffering from severe dysentery arrived in Paris in October, 1865, during the prevalence of cholera. He inhabited a healthy locality, in which there had been no cholera. Some days after his arrival, the chambermaid took cholera and died in twelve days; after her several other servants were seized with cholera, but none died. Believing that this outbreak was due to the extremely offensive evacuations of his dysenteric patient, Dr. Paul employed a solution of hyposulphite of soda as a disinfectant. To the great comfort of those in attendance, the fetid odour from that moment disappeared. Not content with this amelioration, however, Dr. Paul sought to disinfect the offending matter before it left the intestine, for which purpose he employed the solution in the form of enemas. The effect of this was not only to destroy the odour of the evacuations, but also to give considerable relief to the patient, the intestine becoming less painful and defecation less irksome.

Second fact:—Dr. Paul, considering that the lochia may be a fruitful cause of puerperal diseases, resolved to try the disinfectant action of hyposulphite of soda as a preventive of these distressing obstetric sequelae. For this purpose, he sprinkled the napkins to be applied to the parts with solution of the hyposulphite, and found that by that means the disagreeable odour which attends the accouchement-chamber was completely dispelled; and he believes that not only a disagreeable but a dangerous condition of the atmosphere of the apartment may thus be obviated. Dr. Paul states, that far from causing irritation of the parts, the solution has rather anæsthetic properties, and moreover, that wounds previously dressed with it become much less sensitive and less painful when touched.—*Edinburgh M. d. Journ.*, Jan. 1867.

8. *Physiological Action of the Principles of Hellebore.*—M. MARMÉ has published the results of his investigations upon the action of *helleboreine* and *helleboreine*, two substances prepared from the roots of green and black hellebore, and which he looks upon as glycosides. Helleboreine in small doses acts somewhat like digitaline, and diminishes the pulse; in larger doses, on the contrary, it accelerates it and produces a brief paralysis of the heart. It increases the secretion of saliva as readily when introduced into the blood as into the mouth. It acts as an irritant to the digestive tube, producing violent vomiting and dysenteric diarrhoea accompanied with severe pain; it causes hyperæmia of the pelvic organs, especially in women. Helleboreine acts on the intestines like helleboreine, but differs from it in being slightly narcotic also.—*Lancet*, Jan. 12, 1867.

9. *Absorption of Phosphorus.*—HERREN, HUSEMANN, and MARMÉ have concluded, from their numerous experiments, that, contrary to the general supposition, phosphorus in the uncombined condition is absorbed into the system. They state—1. That when oil of phosphorus is introduced by means of a tube into the stomach of dogs or cats, it may be detected in the liver by Mitscherlich's process in two or three hours after its ingestion. 2. Phosphorus may be demonstrated in the liver of herbivorous animals, as well as in those of carnivora. 3. The dose necessary to enable the detection of phosphorus in the liver is extremely small. By using Mitscherlich's process one may detect the phosphorescent light in the liver of rabbits to which so small a dose as a single cubic centimetre of the oil has been given. 4. Sometimes a strong odour of phosphorus is obtained by macerating the liver in sulphuric acid. 5. Phosphorus may also be detected in the heart and in its contents, especially when the oil has been administered in large doses.—*Ibid.*

10. *Administration of Cod-Liver Oil.*—Dr. LUDOVIC ROULAND proposes the following formula for disguising the taste of cod-liver oil: Of the oil, 100 parts; alcohol, of the density .9396 (*i. e.*, rather weaker than proof spirit), 60 parts; essence of peppermint, 3 parts. These form an emulsion which may be given in tablespoonful doses thrice a-day. Dr. Rouland has succeeded in giving the oil in this form in cases in which it was previously intolerable. But in certain cases which have resisted the oil even in this form, he has employed the following substitute with advantage: almond oil, 60 parts; cacao butter, 3 parts; alcohol, of the density .9396, 30 parts; syrup of fir-tops, 40 parts; tincture of orange-peel and phosphate of lime, of each 5 parts. Hypophosphite of lime may be used instead of the phosphate.—*Edinburgh Med. Journ.*, Jan. 1867, from *Abeille Médicale*.

MEDICAL PATHOLOGY, SPECIAL THERAPEUTICS, AND PRACTICAL MEDICINE.

11. *Pathology of Cerebral Softening.*—Two Parisian hospital internes, MM. PREVOST and COTARD, have diligently availed themselves of the opportunities afforded them during their residence at the Salpêtrière, of studying the pathology of cerebral softening. In addition to noticing the appearances presented in the brains of persons dying with softening of the brain, they have, by the advice of M. Vulpian, produced artificially in animals some of the symptoms attending this morbid condition. Their researches, and the conclusions derived therefrom, were last year communicated to the Société de Biologie, and have appeared in various numbers of the *Gazette Médicale de Paris* for the present year. Their object, they state, has been to determine the true relation of obstruction of the bloodvessels to cerebral softening. No one, they say, denies in the present day, the part which obliteration of the vessels plays in the production of softening of the brain; but are all cases of softening to be attributed

to this cause? Having related and commented on a number of experiments and *post-mortem* examinations, and given a general summary of the results, MM. Prevost and Cotard remark, that they have not studied every point in the history of cerebral softening. This was not their intention: their purpose has been to offer some new considerations, and to elucidate some still obscure points. They have taken no notice of the various kinds of inflammatory softening. The following are the principal conclusions at which they have arrived.

Experiments on animals (consisting in the injection into the vessels of lycopodium or snuff) has enabled them, by means of these artificial emboli, to produce softening identical with that which is observed in man, and to follow its progress through various stages. In this way they have been able to study the hyperæmia which is first produced, the necrobiotic¹ degeneration which follows, and, finally, the production of connective tissue and the formation of yellow patches which belong to the third period of softening. Analogous experiments have already been made by MM. Virchow, Cohn, Panum, etc.; but the procedures employed by them have produced death too rapidly to allow them to study softening in its different phases. From their experiments, MM. Prevost and Cotard have ascertained that ordinarily a distinct congestion is produced at the points where the obstructed artery is distributed. The cause of this hyperæmia it is difficult to determine at present; but, whatever may be its mechanical cause, the hyperæmia of red softening must be considered as of an entirely different nature. As early as the third day, there are present well defined granular bodies, and a large number of fatty granulations not yet agglomerated; these are collected around the capillaries, forming, as it were, a sheath to these vessels. In some instances, the walls of the capillaries have presented consecutive granular and fatty degeneration; and, in one case, dissecting aneurisms were formed. In a dog which survived the experiment fifteen days, a true yellow patch was found in the cerebral convolutions.

The study of cases at the Salpêtrière, in which cerebral softening has been found after death, has led the authors to consider the process very analogous to that which they have artificially induced in animals. The necrobiotic process has appeared to them almost always to depend on arrest of the cerebral circulation, varying in origin; and they have observed a certain relation between the various forms of disturbance and the characters of the softening. The disturbance of the circulation sometimes arose from obstruction of any artery by a thrombus or embolus; sometimes from atheromatous degeneration of the cerebral arteries; sometimes, perhaps, from more or less general capillary embolism. In two cases, no cause could be ascertained; but perhaps the arterial obstruction escaped notice. None of their observations have led them to infer with certainty that softening has been due to atheromatous degeneration of the capillaries; this degeneration may be consecutive.

Phenomena of irritation are sometimes added to the process which essentially constitutes softening. In some instances, inflammation and suppuration took place around the infarctus formed in dogs; and the authors endeavour to trace a relation between these phenomena and the production of false membranes on the dura mater at the level of old foci of softening.

In speaking of the symptoms, they point out that the attacks of vertigo and the apoplecticiform paroxysms followed by rapid death without lesion of the nervous centres, which most authors have ascribed to congestion, are due to impeded cerebral circulation. They endeavour to establish a direct relation between the intensity of the attack and the extent of the interference with the supply of blood; and they show that both thrombosis and embolia may give rise to sudden death. Regarding paralysis, spasm, and other symptoms of softening, they have but little to add to what has already been said by other authors. The paralysis, they find, most frequently sets in suddenly, and rarely follows a progressive course; hence no diagnostic value can be attached to this symptom. Examination of the temperature of the rectum in some instances, and the information on this point which the authors have derived from M. Chareot, leads

¹ Necrobiotic (Fr. *nécrobiotique*), from *necro*, dead, and *bios*, life, a term denoting the death of tissues during the life of the individual.

them to conclude that the temperature of the body is not essentially raised during cerebral softening; and hence that, if inflammation have any share in the process, it must be altogether secondary. It would, they observe, be interesting to make a similar series of observations in cases of inflammatory softening.—*Brit. Med. Journ.*, Nov. 17, 1866, from *Gazette Médicale de Paris*, July 14, 1866.

12. *Apoplexy of the Medulla*.—M. LÉVIER, after describing a case of apoplexy in the lumbar region, comments on the cases of medullary apoplexy hitherto reported. In the medulla oblongata, there have been nine cases, four only being pure; the results were, loss of consciousness, involuntary epileptiform movements, and sudden death. Of apoplexy in the spinal cord there were seventeen cases; in two-thirds of these, the lesion was in the upper part of the medulla. The attack was rarely sudden; it was generally preceded for a week or a fortnight by pain in the spinal cord and symptoms of congestion. The first symptom is paralysis, which often occurs during sleep, and affects the sphincters; its progress is rapid, and it is not accompanied by contractions of the limbs; its extent depends on the seat of the apoplexy. Reflex excitability is destroyed. There are ordinarily greatly impeded respiration, feeble cough, difficulty in expectoration, aphonia, and impairment of speech. Paralysis of sensation generally follows that of motion; sometimes there is hyperæsthesia; the spine is not tender on pressure. Both sides, or one only, may be paralyzed; in three instances of the latter which occurred, there was paralysis of sensation on the opposite side. There is elevation of temperature in the paralyzed parts. The duration of the disease varies from a few hours to some months. The diagnosis may be difficult. In meningeal apoplexy, there are convulsions; the paralysis of motion is less complete; moreover, it is generally secondary, occurring in the course of tetanic or convulsive affections. Congestion of the medulla is distinguished by the short duration of the paralysis, the slowness of the symptoms, and the rapid return of health.—*Brit. Med. Journ.*, Dec. 22, 1866, from *Schweizerische Zeitschr.*, and *Gaz. Méd. de Paris*, June 9, 1866.

13. *Etiology of Eczema*.—DR. FRANK SMITH, of Sheffield, has recently made some very important observations in reference to the etiology of eczema in its relation to some disorder of the renal function, as shown by the presence of indican in the urine. In nine out of ten cases Dr. Smith has detected indican in pathological quantities. Indican is supposed to be due to a retardation of the process of declension from the complex to the more simple of the products of function and secretion. Its own highly complex formula is a strong evidence in favour of this opinion, in addition to the ease with which it is broken up into leucine, indigo, and glucine. Dr. Smith suggests that this retardation is due to accumulation of urea and other products of waste in the blood, owing to deficient renal secretion; for he has detected urea in considerable amount in the serum of eczematous patients. Indican occurs in the urine in the reaction stage of cholera and in Bright's disease. The spectrum of the solution prepared from the urine for the detection of indican is the same as that of common indigo. These observations are exceedingly important and suggestive.—*Lancet*, Feb. 2, 1867.

14. *Herpes Circinatus from Favus in the Cat*.—DR. TILBURY FOX exhibited to the Pathological Society of London, Nov. 13, 1866, several specimens of parasitic fungi sent to him by Dr. Purser, of Dublin—one from a favus patch on the paw of the cat, the others from herpes circinatus (tinea circinata) of the arm produced by inoculation with the fungus (achorion) from the favus of the cat. It appears two cats were affected by favus, the one already mentioned, and a second about its nose; attempts were made by one of the ladies in the house to rub off the crusts from the diseased places in these cats, and very shortly afterwards tinea circinata showed itself about her hands, arms, and shoulders; three other inmates (females) were similarly attacked. The disease was most carefully diagnosed, and not a feature of favus showed itself. Dr. Purser then inoculated his own arm, and produced what was pronounced to be

tinea circinata (*herpes circinatus*); he sent some of the scales to Dr. Fox, which were exhibited. There was an absence of spores, but mycelial threads were very abundant. They were smaller, less branched, and more devoid of granules than the *achorion*-tubes, characters which belonged to *trichophyton*. The cases were interesting as showing that *favus* may give rise to other forms of parasitic disease, a view which Dr. Fox holds against many authorities, and he remarked that De Bury's recent experiments show conclusively the difficulty of getting an interchange of characters between varieties of the same fungus.—*Med. Times and Gaz.*, Nov. 17, 1866.

[The above statements are to a considerable degree confirmatory of the researches of Prof. Salisbury, related in the present number of this Journal, pp. 379-383. It is but justice to Dr. Salisbury to say that his paper was sent to us early in November of last year, and was intended for the January No. of this Journal, but in consequence of the impossibility of having the wood-cuts done in proper season, it was laid over till the present No.—Ed.]

15. *Treatment of Diseases of the Heart*.—Dr. S. O. HABERSHON, in an interesting paper in the late volume of *Guy's Hospital Reports*, lays down seven principles of treatment in all cases of heart disease.

The first is, as far as possible, to *lessen its work*; and this may, to some extent, be effected by mechanical rest, by a recumbent position, and by the avoidance of sudden changes of temperature.

The second is to *insure regularity of action*, by avoiding mental excitement, by guarding against indigestion, and by never allowing constipation to continue.

The third is to *lessen distension*, especially of the right side of the heart, by purgatives, diuretics, and by mechanically diminishing the quantity of fluid in circulation.

The fourth is the prevention of syncope. With this view, sudden muscular movements must be avoided; stimulants may be required, as ammonia, brandy, etc.; and sedatives must be withheld or cautiously administered.

The fifth is to strengthen the muscular fibres of the heart, by suitable nourishment, a bracing air, if other conditions allow; chalybeate medicines, and if the patient be exhausted by want of sleep, this symptom must, if possible, be relieved.

The sixth is to prevent fibrillation of the blood. For this purpose carbonate of ammonia will often be useful; other alkalis, as potash, soda, and their salts may be beneficial, but, if long-continued in considerable doses, Dr. H. says, they depress the action of the heart. The acetate and iodide of potash may be advantageously combined with the carbonate of ammonia, or perhaps the hydrochlorate of ammonia.

The seventh is to prevent secondary complications, and to relieve them when produced. These complications are—1st, broncho-pneumonia and pleuritic effusion; 2d, pulmonary apoplexy and other hemorrhages; 3d, visceral engorgement, as hepatic and renal congestions, with ascites and anasarca. By freely acting on the bowels, the portal congestion is greatly diminished, and the liver is enabled to act in a normal manner. Thus a free mercurial purge is of great value. The kidneys may be excited to a more vigorous action by a combination of mercurial medicine with squill and with digitalis, when the latter can be borne. Salivation should be avoided. Diuretics are useful. An effectual way of diminishing the anasarca is by puncturing the skin on the thighs. The pulmonary engorgement is sometimes greatly reduced by applying cupping-glasses between the shoulders, or by the application of a blister to the chest.

16. *Treatment of Hemoptysis with Inhalations of Liqueur Ferri Sesquichloridi*.—By Dr. P. Q. BLONDIN. "The local treatment of morbid affections of the air passages, by the inhalation of fluids in the state of vapour, has latterly been very extensively adopted. In no department can we, however, point to such excellent results as in the treatment of hemorrhage of the respiratory passages by means of styptic inhalations. The most important obser-

vations on this subject are undoubtedly those of Fieber,¹ both on account of the fulness of detail with which they are communicated, and of the success with which the treatment was crowned. We fully indorse what Fieber says as to the value of this method: 'If the mode of treatment by inhalation by means of pulverizers had,' he says, 'no other merit than that of rendering possible the direct application of hemostatics to the bleeding points or their immediate vicinity, this would suffice to insure it an honourable place in therapeutics. Not only is one of the most dangerous symptoms often directly removed by the inhalation of styptics, but the dictates of humanity to free the patient from an affection which renders him most uneasy, and fearfully rouses phthisical patients in particular from the consoling illusion of improvement which nature lends them to lighten their sickness, are most rapidly and effectually fulfilled.'²

"Fieber's observations led me to form the resolution to adopt this mode of treatment when opportunity should present itself."

Dr. B., relates three cases treated by him with inhalations of the liquor ferri sesquichloridi. For pulverizing the fluid, Bergson's well-known apparatus was employed.

These cases, he says, "prove that very obstinate bleeding from the air-passages may be arrested by the inhalation of a solution of chloride of iron. They, moreover, show that the inhalation in itself does not give rise to any temporary aggravation of the symptoms, and that if some precautionary measures be taken (to have the solution not too concentrated, and the distance of the patient from the inhaling apparatus not too short), neither is the cough excited by it. I believe that where medical assistance is called to a case of dangerous hemorrhage from the air-passages, this mode of treatment should be immediately employed, and that every physician ought to have the proper apparatus ready at hand, by means of which he can control such a dangerous symptom, and by so doing, probably save or prolong many a life.—*Med. Press and Circular*, Dec. 12, 1866, from *Nederlandsch Archief voor Genees-en Naturkunde*.

17. *Use of Sulphite of Magnesia in Zymotic Diseases*.—H. R. DE RICCI extols (*Dublin Quart. Journ. Med. Sci.*, Nov. 1866) the efficacy of the sulphites in the cure of zymotic diseases. He relates several cases in which he has employed the sulphite of magnesia with great benefit, among others the following:—

"I had under my care a gentleman over eighty, who was suffering from the most aggravated form of pompholyx diutinus I ever witnessed. The bullæ daily appeared all over his body, principally affecting the lower half, and varied in size from a millet-seed to a hen's egg. When first they cropped out their contents were clear; but in twenty-four hours became turbid, then opaque, and the raw surface, which appeared when the bullæ burst, remained long unhealed, and discharged an acrid, bad-smelling pus.

"The patient had been for some months in this state, and was gradually getting worse, when he came up from the country and placed himself under my care; every variety of treatment having been tried, both locally and constitutionally, without obtaining any beneficial result. I determined, in consultation with Dr. Hudson, on placing the patient under a sulphitic treatment, in the hopes of arresting the further increase of the disease, and thus giving nature an opportunity of eliminating the poison. As the patient was so advanced in years I preferred to commence by administering the remedy endermically, as I wanted besides to observe what effect the remedy would have on the secreting surfaces. I therefore dressed the raw spots with pledgets of lint soaked in a saturated solution of sulphite of soda in water, adding a little glycerine to the lotion; the immediate effect on the sores was most remarkable; by the second day they had completely lost their unhealthy dirty look, and had assumed a bright rosy hue, and were quickly skinning on the edges, and the pain caused by such an

¹ Wiener med. Wochenschrift, 1863, Nos. 49, 50; 1864, No. 27; 1865, Nos. 5, 6, 7, and 8.

² Die Inhalation medicamentöser Flüssigkeiten, etc. von Dr. Friedrich Fiebre, p. 133.

extent of raw surface was completely relieved by the application. At this time the extent of the sores was so great that scarcely a sound spot could be found from the hips to the soles of the feet. Being curious to ascertain whether the remedy was acting only locally or was also entering the system generally, I got my friend Dr. Davy to examine some of the urine of this gentleman, when he found that it gave ample evidence of the presence of *sulphurous acid*. After some weeks of treatment by external application, during which a very great improvement could be observed, both in the size of the bullæ and their daily numbers, I commenced the internal administration of the remedy in ten-grain doses every fourth hour, using this time the sulphite of magnesia; no bad result occurred—no diarrhoea, no loss of appetite, no nausea, but a still greater improvement; the bullæ now appearing only at intervals of two or three days, never larger than half an inch in diameter, and only one or two at a time; while at the commencement, when he first came under my care, the average number of bullæ which daily made their appearance was from twenty-five to thirty, their size averaging one inch and a half in diameter. The patient was now so far improved as to be able to go out to drive every day, and to enjoy life, whereas during the previous few months his existence had been a burthen to him; unfortunately, one day, he exposed himself to cold, got influenza, of which at the time there was an epidemic in Dublin, and in a few days he died—a result not to be wondered at when it is remembered that influenza at the age of eighty-two is almost always fatal. Two instructive facts are deducible from the above case: first and foremost, that sulphite of magnesia does not disturb digestion nor cause diarrhoea, both of which bad effects have been laid to the charge of this remedy; and secondly, that the sulphites, even when applied externally, are absorbed and circulated as *sulphates*, and finally excreted by the kidneys undecomposed, *at least, in part*.

18. *Subnitrate of Bismuth in Epidemic Dysentery of Hot Countries*.—M. BRASSAC, of the French navy, having had an opportunity of treating dysentery upon M. Monneret's plan of large doses of bismuth, speaks of the results with great satisfaction. Beginning with 15 to 20 grammes, 231 to 308 grains a day the quantity was rapidly increased to from 60 to 70 grammes, 926 to 1080 grains, by the rate of ten grammes a day, proportioning the quantity to the presumed gravity of the case, and being guided by the effects of the first doses. When convalescence was established, the bismuth was gradually diminished, moderate quantities being continued for fifteen or twenty days even after the patient had been brought to one stool *per diem*. This precaution of continuing the treatment after the establishment of convalescence is strongly enforced. M. Brassac never prescribed the bismuth in small doses, which he believes to be injurious, and, moreover, he attributes the small success of his colleagues, as compared with his own, to their timidity in the use of the drug. The quantity prescribed for the day was divided into not more than five doses, given in unleavened bread, or in broth or rice-water, or mixed with other suitable articles of diet. He found that after a few doses the patients were able to take such articles of diet as before the administration of the bismuth they dared not touch. Bismuth was also in some cases applied by enemata.—*Ed. Med. Jour.*, Jan. 1867, from *Bull. Gen. de Thérap.*

19. *Decoction of Sage in Profuse Sweating*.—M. VIGNARD, of Nantes, after the manner of Van Swieten, has successfully employed decoction of sage for the relief of profuse sweating. In the case of a man twenty-five years of age, who had suffered, from time to time, during many years from attacks of this kind, the remedy proved effectual. The sweating began suddenly between two and three o'clock in the morning all over the body, and was so profuse as to completely saturate the bed-clothes and to a considerable extent the mattress also. In consequence of the regularity of the attacks, sulphate of quinia was tried as an antiperiodic, but unavailingly; the perspiration regularly reappeared, and without any apparent pathological cause. At length M. Vignard prescribed the following preparation: Take of chopped sage leaves, a large teaspoonful (*une once*); of water, six fluidounces. Boil the sage for a

minute or two in the water; let it stand to cool, then filter and sweeten to taste. From that time the perspiration ceased whenever the decoction was taken, but reappeared when it was omitted. M. Vignard suggests the use of this remedy in the colliquative sweating of phthisis.—*Edinburgh Med. Journ.*, Jan. 1867, from *Journ. de Méd. de Nantes*.

20. *A Case of Resuscitation after Two Hours' apparent Death by Drowning, occurring in the late Catastrophe at Regent's Park.*—The following remarkable case of this is related (*Medical Press and Circular*, Jan. 30th, 1867) by JOHN DENNAN, Esq. It is to be regretted that no information is furnished in regard to the important point as to how long the man had been actually submerged before being withdrawn from the water.

"On the afternoon of Tuesday, the 15th instant, about a quarter past four, I received, in the absence of Mr. Oubr , a summons to view a dead body just withdrawn from the ornamental waters in Regent's Park.

"While on the way I entered somewhat minutely into the particulars with my guide, and on my arrival determined to examine the subject very carefully.

"The man was apparently *quite dead*, and I heard the following statement, viz: that he had left his abode in perfect health, and joined in the general amusements on the ice, and was one of those at some distance from the shore when the catastrophe occurred. I particularly observed that the patient was intensely cold, from having been immersed some minutes, and having struggled in the water for more than half an hour. There was neither breathing or heart's action, the pupils dilated, the jaws clenched, and the limbs contracted, so much so that the clothes had to be cut off before anything could be done to the patient.

"A frothy mucus covered the mouth and nostrils, the body was much swollen and I had it placed on an incline at an angle of about 35 , as the body was so very cold. I commenced, with the assistance of the two men who brought him home, to try to restore warmth by degrees, rubbing the chest and limbs thoroughly and swiftly with ice and snow, cleansing the mouth and nostrils from time to time, and adopting Silvester's method of artificial respiration for more than two hours. After a quantity of frothy mucus was discharged slight signs of animation were perceptible, though so faint that I almost despaired.

"I then had him well wrapped in blankets, placing large tins of hot water at the feet, and mustard poultices on the chest, while the body was well rubbed with warm flannel under the blankets. I continued this treatment for three-quarters of an hour, at the same time continuing to imitate the movements of breathing. A decided improvement then took place. The patient's jaws relaxed, and he appeared to breathe more freely. I then administered two teaspoonfuls of warm water, which caused him to vomit slightly. As soon as he commenced breathing freely I was able to give him a little warm tea, which he apparently relished. I may here observe that I could not induce him to take spirits.

"The patient was now placed in a warm bed prepared for him, soothed to sleep, and all undue excitement prevented.

"The patient was feverish for one or two days, but on the following Friday I had the pleasure of receiving a visit from him."

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

21. *On the Diagnostic Value of the Retracted Nipple as a Symptom of Disease of the Breast.*—THOMAS BRYANT, Esq., Assistant-Surgeon, Guy's Hospital, asserts (*British Med. Journ.*, Dec. 8, 1866) confidently that the retracted nipple, as a sign of carcinoma of the mamma, has been assigned a value to which it is not entitled, and that even at the present day, its true significance is

not generally understood. "It is too true," he says, "that it is even now regarded by many men as a symptom of special value, and that, when present, it is looked upon as pathognomonic of a cancerous affection; whilst, on the other hand, we find men mistaking a cancerous tumour for a benign one simply on account of the absence of this so-called pathognomonic symptom."

Mr. B. quotes several cases which show that retracted nipple "is by no means an uncommon associate of the inflammatory and cystic diseases of the breast; and that, as a consequence, it cannot with any certainty be regarded as pathognomonic of the cancerous affections. That it does occur in connection with a cancerous tumour of the breast, is not to be disputed; but that it is a frequent accompaniment of such a disease, is open to doubt; for, on looking over my notes of 222 examples of cancer of the mamma, I find that a retracted nipple existed in only 32 cases, or in about 14.4 per cent. Should the surgeon expect, therefore, to find it in all cases of cancer, he will be disappointed; and should its absence in certain cases lead him to regard a tumour as innocent, he will, in the majority of cases, be found wrong. This symptom may be found in the infiltrating form of cancer of the breast, whether partial or complete; that is, when the disease has involved the whole gland, or only a lobe. It may also exist in some examples of the tuberos cancer, in those instances in which the tuber is developed between the ducts, and by its growth separates them—thus acting mechanically upon the nipple, and causing its retraction; the retraction, under such circumstances, taking place towards the diseased part. In the generally infiltrating form of cancer, the nipple simply retracts; and, at a later stage of the disease, it may reappear, this reappearance being due to the increase of the disease and the mechanical pressure of the nipple forwards by the tumour beneath."

Mr. B. maintains the cases he relates show "that a retracted nipple is an occasional symptom in acute and chronic inflammation of the breast; that it is found in the cystic disease of the gland, as well as in the cancerous; in fact, that it is met with *in all the diseases of the true gland, whether simple or malignant*. It is absent in the ordinary chronic mammary or adenoid tumours, simply because these tumours are not of the gland itself; and, as a consequence, the nipple, with the gland-ducts, are not interfered with. In what way, then, it may be asked, is this retraction of the nipple generally brought about? It must depend on some general or simple cause, as it is found under so many different conditions; 'for,' as I have stated in another place, *Clinical Surgery*, Part v. p. 429), 'a retracted nipple may be described as an accidental symptom in the development of a tumour; it is the product of mechanical causes, and its presence is determined by the manner in which the gland is involved in the disease, rather than the nature of the affection itself. Should any tumour, simple or malignant—should any abscess, chronic or acute—attack the centre of the mammary gland, a retracted nipple, in all probability, will be produced; for, as the disease so placed will necessarily cause material separation of the gland-ducts, their extremities—terminating in the nipple—must be drawn upon, and, as a consequence, a retracted nipple will be the result.'

"In an early stage of an infiltrating cancer of the organ, this symptom is one of *occasional* occurrence; the nipple being drawn towards the side of the gland, which may be involved. At a later stage of the disease, however, when the infiltration is more complete, the nipple may again project. In a central chronic abscess of the breast, the retracted nipple is equally common; and in the true cystic adenocoeles, it may be also present. The explanation of the cause of this symptom in all of these cases is alike, being purely mechanical, and in a measure accidental."

22. *Periodical Inflammation of the Right Knee-Joint*.—MR. CHAS. H. MOORE, Surgeon to Middlesex Hospital, related to the Royal Medical and Chirurgical Society (Jan. 22, 1867) two cases of this.

The first case was that of a woman aged 43, who had had ague in girlhood and was cured. Eight years afterwards, at the end of a day of fatiguing work, she was attacked with inflammation of the right knee-joint, which increased till the third day and then subsided. Thirty days afterwards a similar attack came

on, and the inflammation was repeated many times at the same interval. From the third month of pregnancy to the third month of lactation the attacks were quite interrupted. They then returned again, and when she came under Mr. Moore's care they had continued eighteen years. The only difference in the early and later characters of the ailments was that nine instead of thirty days constituted the interval; but successive attacks recurred so punctually that they could be predicted almost to an hour. This patient was not cured.

The second case was that of a girl of twenty-one, who never had ague, but who was attacked with inflammation of the right knee-joint after washing stone steps. The joint swelled, and on the third day was painful, and after that was well again. Twelve days from the attack, the whole local process was repeated in every particular without any external occasion, and again an intermission of perfect health ensued. She had altogether nearly twenty attacks, but they were not always quite punctual to the day, some occurring thirteen days and one or two eleven days from the previous one. Towards the subsidence of the disease two attacks missed, and the interval was three times as long as usual. This patient got well, apparently from the effect of quinia.

The first patient was under Mr. Moore's care only a short time, but he had the opportunity of witnessing three or four attacks. The second was under his observation during many of the attacks, and he was able to take precautions with a view to prevent their being feigned or artificially produced. In each case there was a movable body in the joint, and to it possibly the first onset of inflammation was owing; but the subsequent attacks were too precisely regular in their outbreak to be referred to any accidental cause: they were out of the date of the catamenia, and Mr. Moore expressed the opinion that they were in both patients of the nature of ague.

Mr. Moore referred to several examples of transient local disease characterized by recurrence at regular intervals. In some of these vomiting came on weekly for many years; in others, various inflammations of the throat, tonsils, eyes, &c., occurred daily at a regular hour. One case was that of a distinct quotidian ague of the arm, the rigor, heat, and stage of perspiration being marked in each fit. Most of these cases were cured by arsenic or quinia.

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 23. *Diabetic Gangrene*.—M. VERNEUIL lately brought under the notice of the Surgical Society of Paris the subject of gangrene occurring in diabetic patients, of which he had met with six instances in the course of three months. In the first case, he was called to perform amputation in a person affected with gangrene of the foot and lower part of the leg. On inquiry, he found the patient diabetic. The man, a seller of wine, had been of somewhat intemperate habits. The gangrene was said to have originated in the pressure of the shoe on the little toe, and to have been soon followed by the appearance of other gangrenous spots on the foot and leg. The man ultimately died; M. Verneuil having abstained judiciously from any surgical interference. In the second case, that of a man aged 50, the patient had for some time had bunions, one of which became ulcerated. As the sore observed no tendency to heal, M. Verneuil examined the urine, and found sugar. The patient ultimately died worn out with profuse diarrhoea, marasmus, and low delirium. In the third case, a patient in the Lariboisière Hospital had an ulcer of the heel, of the size of a finger, with sharply defined edges, and œdema of the leg. The heart and liver appeared healthy; but the urine contained both sugar and albumen. This patient also died; but nothing in the kidneys could be found that was capable of accounting for the albumen. The fourth case was that of an ecclesiastic of high rank, about 66 years old. He had diabetes, with gangrene of the little toe, several eschars on the great toe and dorsum of the foot, and an extensive carbuncular phlegmon on the sole. In the fifth case, that of a lady, there was a carbuncle on the back. Incisions made into this producing no improvement, M. Verneuil examined the urine and found it diabetic. In the sixth case, that of a man aged 55, paralytic and subject to intermittent fever, there was a gangrenous eschar in the groin, with offensive discharge. This patient, alone of the six, so far improved under an alkaline treatment as to recover; in the other five, death occurred in a few days or weeks after the appearance of the local disease. Such cases as those

related, M. Vernueil observes, point to the advisability of examining the urine before operating in cases of gangrene of the lower limbs.—*Brit. Med. Journ.*, Jan. 19, 1867, from *L'Union Médicale*, 1st Dec., 1866.

24. *Sprains in Children*.—M. GUERSANT, in an article in the *Bulletin de Thérapeutique*, August 15th, notices the sprains produced in children by the mischievous practice of suddenly raising them by a single arm, the limb always being more or less twisted into a state of pronation or supination, with distension or stretching of the joints at the wrist and elbow taking place. It is very rare for fracture or dislocation to be produced in this way, but the appearances may be such as to cause alarm to the friends of the child and sometimes even to the medical attendants. In ordinary cases, there is no appreciable deformity present, but the movements of the parts give great suffering to the child, and on the execution of these a sound is sometimes heard, without seeming to proceed from any precise spot, such as might be produced by the sliding of articular surfaces on each other. Quite suddenly, after the execution of some of these movements, the child ceases to complain; and without our seeming to have done anything to remedy the defect, he becomes enabled to move the arm as before the accident. Sometimes, however, the pain persists, and there may be great tenderness around some one of the articulations. It is not always possible to make a correct diagnosis in these cases; but when neither fracture or dislocation can be detected, a sprain may be said to have been produced, *i.e.*, a sliding of the articular surfaces with distension of the ligaments; or, in other words, a tendency to a dislocation which has not been effected. The accident is not always confined to the wrist or elbow, and may implicate more than one joint. The arm should be kept at right angles, either in supination or pronation, according to the preference of the patient. The child then complains no more, and in three or four days is cured. If at the end of this time pain persists, a starch bandage may be applied for eight or ten days.—*Brit. and For. Med. Chir. Rev.*, Jan. 1867.

25. *Reducing Dislocations by means of Caoutchouc*.—M. ANGER observes that, having for some time employed this substance in the treatment of ankylosis, fractures, spontaneous dislocations, &c., the good results derived from it induced him to extend its application to traumatic dislocations. A man was brought to the clinic with dislocation of the shoulder, which the ordinary procedures failed to reduce. The trunk being secured, extension was applied by means of a tube of caoutchouc, the thickness of the little finger and sixty centimètres in length. Gently employed at first, the traction was gradually increased until the tube had been wound four times around the bed-post, thus making four traction cords of fifteen centimètres each. The extension was kept up for nearly half an hour, the patient by that time feeling quite exhausted; and the muscles which had resisted the reduction having become relaxed this was easily accomplished. This mode of making the extension by its gradual and gentle, though efficient character, M. Anger considers as very superior to any of the ordinary procedures. The amount of traction employed must be proportioned to the resistance offered, which varies by reason of strength, sex, and age. In the present case, the subject of which was athletic and the dislocation complicated, four tubes, fifteen centimètres in length, extended to double their length, amply sufficed. The extension should be regulated in ordinary cases so as to obtain complete muscular relaxation in fifteen or twenty minutes.—*Ibid.*, from *Gazette des Hôpitaux*, No. 74.

26. *Dislocation of the Sixth from the Seventh Cervical Vertebra forwards without Fracture; Immediate Paraplegia; Death on the Twenty-First Day*.—M. BERKELEY HILL, Assist. Surg. University College Hospital, communicated to the Royal Med. and Chirurg. Soc. (Jan. 22, 1867), a case of this, in which during life and even after death, until the injured parts were laid bare, no deformity of the spinal column could be detected. The paraplegia involved all the parts below the seventh vertebra. There was no irritation of the spinal cord during life. After death, which took place on the twenty-first day, the cord

was found softened and compressed by much blood, as well as flattened by the dislocated arch of the sixth vertebra forcing it against the body of the seventh. The urine was at first alkaline, and loaded with mucus and pus; but at the end of the first week it was restored to its natural condition by continuous drainage of the bladder.

The author referred to the opinions of McDonnell and others in favour of trephining the arches of the vertebrae in cases of displaced vertebrae with paraplegia, and stated the reasons which dissuaded him from attempting it in this instance. These were—the situation of the injury being so high up in the vertebral column; the inability to ascertain with exactness, during life, the amount of the injury to the spinal column; the small probability of the auxiliary muscles of respiration regaining their motor power after the cord had been released from pressure; and the possibility of so severe an operation causing immediate death by displacing the phrenic nerve, or by the shock it would involve to the exhausted patient.

Mr. HOLMES thought that there were two points of interest in the case brought forward—1st. As to the rarity of such results from injury to the spine. 2d. The question of the propriety of operation. He was not certain that displacement in the cervical region was really so very rare. Several specimens showing displacement of the cervical vertebrae without fracture were in the St. George's Hospital museum, and there was one showing displacement of the last dorsal from the first lumbar, with fracture of the transverse processes. Then, as to the operation, although warmly recommended, it had not been approved in practice. Trephining the spine, or, more correctly, the laminae of the vertebrae, had been performed by Cline, and the operation had recently been strongly urged by Brown-Séquard. Mr. Holmes was surprised that Mr. Hill had not noticed the remarkable statement of Mr. Hutchinson in the last volume of the *London Hospital Reports* on injuries to the spine. Mr. Hutchinson shows very satisfactorily that the displacement of the spinal column is very easily remedied by extension. This was so in Mr. Hill's case. If, then, the vertebrae could be put in position so easily, why operate? Then, when there is fracture, the fracture is of the body and not of the laminae of the vertebrae, and there is no complete and permanent displacement in such cases. In cases of this kind will trephining the laminae prevent pressure of the displaced body on the anterior part of the cord? Dr. Brown-Séquard thinks removing the laminae would indirectly relieve the pressure the body exercises in front. On this point Mr. Holmes would give no decided opinion, except that, if such an operation could have a chance of relieving in the manner supposed, the laminae of at least three vertebrae ought to be removed. Besides, Mr. Hutchinson showed that the pressure is not permanent, and that the paralysis results from contusion or smash of the spinal cord. If this be so, Mr. Hutchinson's facts show that the operation of trephining will be nugatory, and can do no good. Mr. Holmes did not find that in Dr. Gordon's case the operation had relieved the paralysis, and this was so in every case. The fact of survival after the operation was no evidence that the operation saved life, as a survival was common after injuries to the lower part of the spine. In the case Mr. Adams had mentioned of reduction there was no paralysis, and in the case he (Mr. Holmes) had seen, in which there had been paralysis, reduction was not followed by restoration of power to the palsied parts. He instanced a case in which Mr. Caesar Hawkins had reduced a displacement of the last dorsal from the first lumbar without any effect on the paralysis. Mr. Hutchinson believed that reduction had no effect on the paralysis, and thus it was not necessary to add the risks of an operation to the dangers of the injury. In Mr. Hill's patient reduction was easy, and therefore in such a case it was utterly unreasonable to operate.

Mr. CALLENDER was glad that the question of operation had been raised. It could not be considered irrelevant, as in most cases of the kind a fatal issue follows. In Dr. Gordon's case a certain amount of advantage was claimed. The patient regained power over the bladder, and he lost the painful affection of his limbs. But results quite as good follow without operation. Not long ago a patient had been treated in St. Bartholomew's Hospital by Mr. Paget and by himself (Mr. Callender), who, after an injury to the lower dorsal spine, had

difficulty with his motions and urine, and appeared sinking. Yet this patient rallied, and got into fair general health. He could not walk, but was able to enjoy life to a very considerable extent. After his discharge, being poor, he had no sufficient nursing, and then died, because he had not necessary comforts and attention. In this case the results were as good as in Dr. Gordon's case. The man would doubtless have lived if he could have had proper care, as far as the operation or no operation was in question. Dr. Gordon's case was the only one in which any credit could be claimed for the operation. Mr. Callender thought it was an experiment not yet carried out largely enough to warrant positive conclusions.

27. *Fissure of the Rectum*.—Dr. ALFRED COOPER read a paper on the disease before the Medical Society of London. He commenced with a review of the statistics of St. Mark's Hospital, which showed that the most common form of disease of the rectum, and for which the largest number of patients require operation, is fistula in ano; next in order of frequency is internal hemorrhoids, and third on the list is fissure of the rectum. Out of the 126 patients admitted at St. Mark's Hospital in 1866, 138 suffered from fissure; of these, 82 were without complication, 20 were coexistent with internal hemorrhoids, 9 with external hemorrhoids, 3 with polypus, 3 with stricture, and one, in a boy of five years of age, with prostatic. After stating that this affection was often overlooked by many surgeons, he insisted on the necessity of careful examination [he laid particular stress on digital examination in preference to that by the speculum], not only for the sake of a correct diagnosis, but also to ascertain the existence of complications. He observed that the disease was not uncommonly dependent on other morbid conditions of the bowel, and referred more especially to polypus, which he illustrated by the case of a lady who had been twice operated on for fissure; the first operation failed in consequence of a polypoid growth having remained undiscovered, but the patient recovered after the second operation, when this growth was removed. After giving a careful description of the symptoms of fissure, the author proceeded to detail the history of several patients upon whom he had operated where complications existed, and remarked that unless the polypi and hemorrhoids were removed the operation would be a failure. He briefly alluded to the symptoms that should lead the surgeon to suspect the existence of fissure, laying particular stress on the acute and long-continued pain after defecation. He was of opinion that in the early stages of the disease, where it had not existed more than six months, it could be successfully treated without operation by regulating the bowels and applying locally an ointment composed of one scruple of calomel to an ounce of lard. That in cases of longer standing, as a rule, operative interference was necessary. That, in operating, three courses were open to the surgeon—forcible rupture, free incision, and limited incision. He discarded the forcible rupture as barbarous and offering no advantage, and preferred the free to the limited incision, as in the latter case the wound heals more slowly, and in some instances it altogether fails to effect a cure.—*Lancet*, Feb. 16, 1867.

28. *Prolapsus of the Urethra in Children*.—M. GUERSANT says that prolapse of the urethra, although scarcely if at all described in surgical works, is not a very rare affection in female children. During twenty years of practice, he has seen it in at least twelve or fifteen patients, aged from 2 to 12 years. The causes of the prolapsus have appeared to him to be, the paroxysms of whooping-cough, or the frequent cough of bronchitis, or constipation demanding violent and frequent efforts at defecation; and also general debility, as during prolonged convalescence from acute diseases, and often in the course of chronic diseases. The patients make but little complaint. Sometimes, however, the desire to pass urine is frequent, and some scalding is felt during the flow. When the labia are separated, the vulva is generally seen to be of higher colour than is normal. At the urinary meatus, there is a small rose-coloured mucous tumour; it appears to proceed from the interior of the canal, and has in its centre an opening, into which a catheter can be introduced, on doing which its nature is at once recognized. The tumour may remain stationary a long time; but some-

times it enlarges slowly, and discharges a sanguineous exudation, afterwards a purulent serosity. It increases in size, and sloughs superficially: the neighbouring parts become inflamed, and vulvitis is produced. The exudation may increase without causing much pain; but the child has heat and smarting in passing urine. M. Guersant has not seen any of these tumours which had been left to their own course for a very long time; but he believes that, at length, they would sphacelate in whole or in part, and give rise to a sero-purulent discharge. The tumour may be confounded with urethral polypus; but, on attentive examination, it will be found that the polypus presents itself in the form of a more or less pedunculated tumour, the pedicle of which reaches within the canal, while the prolapsus has the form of a very small swelling surrounding the meatus urinarius—resembling, on a small scale, prolapsus of the rectum. The only method of giving prompt relief is excision. It is not necessary to use an anæsthetic, unless the child be timid and difficult to manage. The patient is placed at the edge of the bed; the thighs are held apart, and the labia are separated so that the surgeon can plainly see the tumour, and draw it down gently by means of a loop of thread. It is then cut off by means of curved scissors. There is little hemorrhage, and it is easily arrested by the application of cold water: if not, an aqueous solution of perchloride of iron may be applied for a few moments. Cold water dressing, and a few applications of solid nitrate of silver, are sufficient to produce cicatrization. The patients have for a few days some pain in passing urine; but this subsides. In one case, the hemorrhage could not be arrested by perchloride of iron; but M. Guersant succeeded by applying ice for twenty-four hours over the hypogastrium and to the vulva. —*Brit. Med. Journ.*, Nov. 17, 1866, from *Bull. Gén. de Thérap.*, Oct. 15, 1866.

29. *Treatment of Infantile Syphilis.*—Dr. R. FORSTER, of Dresden, gives the results of observation, made on 68 cases in a period of nine years and a half, with regard to the medicinal treatment of infantile syphilis and on certain circumstances connected therewith. He first calls attention to the fact, that syphilis, appearing in newly-born children or soon after birth, generally in the form of pemphigus, is almost inevitably fatal; while the prognosis is more favourable, the farther the appearance of the disease is removed from the period of birth. Dr. Förster divides his cases into two classes: 1, children under half a year old, and 2, children above that age. As bearing on the question whether syphilis can be communicated through the milk, the first class is divided into children which were suckling, and those which were not. The 68 children (28 males and 40 females) varied in age from 12 days to 4½ years; 45 (about 66 per cent.) recovered; and 23 (or 34 per cent.) died. In five cases there was a relapse; in one there were two relapses. Of 36 children who at the commencement, and generally through the course of the treatment, continued to suck, only 6 died; while of 18 children of similar age who were deprived of the breast, 13 died. It also appears from Förster's statistics, that artificially fed children are more imperilled, the earlier the syphilis has appeared. In the 36 cases, the children were, with one exception, suckled by their own mothers: one only by a nurse. There is, according to Förster, no certain proof that an infant suffering from hereditary syphilis can infect its mother. The treatment employed by Förster was chiefly mercurial. Of the 68 cases (increased to 74 by the relapses), protiodide of mercury alone was given in 51; in 21 other cases antisiphilitic remedies were given with mercury; in 2 only no mercury was used. Förster admits that diarrhœa sometimes follows the use of the protiodide of mercury. But, he says, diarrhœa often enough occurs in infantile syphilis when no mercury has been given; and that it did not increase, but diminished, when the use of the protiodide was commenced. He gave the medicine in doses of from one-twelfth to one-eighth of a grain twice daily, generally with powdered gum. Wine was sometimes also administered. Mercurial vapour-baths were not used, because their administration cannot be always intrusted to the attendants, and because the quantity of mercury taken into the system is less accurately defined than when it is given internally. In two cases only, of small atrophic artificially fed children, inunction was employed. Dr. Förster never found salivation to be produced in any of his cases, although large amounts of

mercury were used. Of the 51 cases treated with protiodide of mercury, 17 died and 34 recovered. The quantity of the protiodide taken by the latter varied from $2\frac{1}{2}$ to 8 grains; the average being $5\frac{1}{4}$ grains. The duration of treatment varied from $2\frac{1}{2}$ to 13 weeks; the average being $5\frac{3}{4}$ weeks. But, if the time occupied in treating the diarrhoea, debility, &c., be included, the average is increased to 8 weeks.—*British Med. Journ.*, Dec. 22, 1866, from *Deutsches Archiv für Klin. Med.*

30. *Influence exerted by Treatment in Hospital upon the Event of Surgical Operations and Accidents.*—Mr. T. HOLMES, Asst. Surg. to St. George's Hospital, in a paper read at the 34th annual meeting of the British Medical Association, has very carefully examined this question, and has shown the total want of exact knowledge with which this subject has been hitherto treated and the great need of more accurate and reliable information as to the condition of our existing hospitals, than the present arrangements of most of them permit us to obtain.

Miss Nightingale and Dr. Farr have intimated that, except as schools of medical and surgical instruction, hospitals have done as much harm as good; *i. e.*, that the diseases generated in hospitals are sufficient to counterbalance the effects of rest, cleanliness, good nursing, good diet, medical skill, &c.

Mr. H. gives the statistical results of a number of operations, with the causes of death, and he shows that the mortality which can be safely charged to hospital influences is very small.

He shows, he thinks:—

"(1) that a large proportion—probably about one-half—of the deaths after surgical operation and accident are due to previous disease, to the inevitable effect of the accident, or to other unavoidable causes; (2) that, of those which remain, pyæmia is the cause of the vast majority; (3) that pyæmia causes a percentage of deaths far smaller than is generally imagined; (4) that there is much reason for believing that the death-rate, due to hospital diseases of all kinds, even in large metropolitan hospitals, does not exceed two in one thousand patients; (5) that no data exist by which we can estimate, or even form a conjecture whether this is a larger or smaller death-rate than would prevail in the same class of cases and patients if treated in smaller hospitals, in detached chambers, or in their own houses; and, therefore, that the influence for evil which hospitals exercise on the progress of this class of cases has been much exaggerated.

"Yet it would be very idle and very uncandid to deny that such an influence does appear to exist. I have seen, in hospitals, operations in themselves of a very slight nature prove fatal by pyæmia; slight wounds converted into grave and often fatal injuries by erysipelas or diffuse cellulitis; ulcers apparently trivial and easily curable, form the starting point of sloughing which has cost the patient his limb or his life. It is true that all these things happen also in private practice; and perhaps their apparent rarity may be due only to the comparative rarity of grave surgical cases in private, as compared with hospital practice. It is also true that, in hospital practice, though such disasters, from the impression they produce on the mind, appear common, they are seen to be really rare when brought to the test of exact record. Yet we cannot bring ourselves to believe that they are not preventable. Only, in order to prevent them, their causes must be exactly determined, which cannot be done without constant record and laborious observation. All this points to the necessity of more methodical and better note-taking and registration in our hospitals, both in town and country.

"But I utterly deny that any great prevalence of hospital diseases in our large hospitals has ever been proved, or, with our present means of information, can be rendered probable. Hence no necessity has been shown to exist either for their removal into country districts, or for breaking up and disintegrating them into smaller institutions."—*Brit. Med. Journ.*, Dec. 22, 1866.

31. *Importance of Preservation of the Periosteum in many Operations.*—Dr. WM. STOKES, JR., Surgeon to the Meath Hospital, Dublin, in his introductory lecture, remarked:—

"M. Ollier, of Lyons, as I mentioned previously, has directed especial attention to the importance of periosteal preservation and transplantation in many operations. In three cases he has removed large portions of the diaphyses of the long bones with favourable results. In his other cases an epiphysis of the bone had to be removed. One of these I had an opportunity of seeing, in which the upper half of the humerus was removed, with complete restoration of bone. From his experiments, therefore, and clinical experiences, as well as from those of some others who are deeply interested in this subject, and from the cases of Dr. Moon and Professor Langenbeck, the following propositions may be stated:—

I. That in sub-periosteal resections the reproduction of bone is more complete and effected with greater rapidity than after total removal of both bone and periosteum.

II. That the osseous reproductive properties of the membrane vary according as it is taken from the long or the short bones, being greater in the former than in the latter (Ollier).

III. That the normal form of the joint is better preserved when this precaution of leaving the periosteal covering is taken.

IV. That the sub-periosteal resections involve less danger than when conducted on the old principle. This proposition is grounded on the result of experiments on the lower animals, the number of unfavourable results which followed when the membrane was removed being much greater than when it was left.

V. That the difficulties attending the separation of the membrane in the dead subject are not to deter us from attempting the operation on the living, inasmuch as the membrane is less adherent in the latter, and also in the diseased than on the healthy bone.

VI. That resections performed in this manner are more conservative, inasmuch as a re-formation of the part removed is effected, and, being attended with less risk to life than the ordinary resections, a greater quantity of bone can be removed, and in this way in a number of cases the necessity for amputation is diminished. The cases I have alluded to—of Dr. Moon in America, and Professor Langenbeck—are illustrative of the truth of this.

VII. That the chances of much shortening of the limb are diminished by this method, as shown by the results of the ankle-joint resections during the late Schleswig-Holstein war.

VIII. That in addition to these the modified Rhino and Urano-plastic operations demonstrate that the happiest results have been obtained by this application of experimental physiology to practical operative surgery."—*Med. Press and Circular*, Dec. 12, 1866.

32. *Injurious Effects of Dressings after Amputations.*—Dr. Burow brought this subject before the profession in 1859, with the object of showing that much of the mortality that follows operations is really due to the employment of dressings. He adduced the slight mortality that had attended his own cases in which these were abstained from as compared with that exhibited by Pauli's statistics. He is now enabled to refer to an additional number of his own cases, making ninety-four altogether, in which the mortality has proved quite trivial. And yet these include numerous cases of amputation of the thigh, leg, arm, &c., many of the patients upon whom the operations were performed being very poor, and treated under disadvantageous sanitary conditions. The stumps in all, however, were left freely exposed to the air, unencumbered with dressings.

As to the execution of the operations, Dr. Burow, when possible, always prefers the tourniquet to manual compression, and performs flap operations whenever the condition of the soft parts admit of this. He disapproves of shaving off the periosteum before dividing the bone, and is very particular in tying every bleeding vessel, believing it far better to tie some of these superfluously than to have the stump disturbed by subsequent bleeding. The surface of the stump is to be left quite exposed until a serous exudation begins to issue, which is generally the case within half an hour, although in some cases we may have to wait some hours for this. The flaps are then brought together by means of two or

three sutures and three or four strips of adhesive plaster, these last sufficing without the sutures in amputation of the arm. After the patient has been placed in bed the stump is only covered with a piece of linen to protect it from the flies, and in the case only of their being much pain ice is resorted to. The very great swelling which takes place in the stump during the second and third days is evidence of the mischievous effects which must result from its confinement by dressings. By Dr. Burow's plan nature is left unimpeded in her process of restoration of the collateral circulation in the divided vessels, and emboli with pyæmia are far less likely to occur. If the swelling of the edge of the stump be very great, the threads may be divided at their points of insertion and left to be discharged, the adhesive plasters being renewed when they become loosened. The discharges are to be gently pressed out from the deeper portions of the wound, and the greatest attention must be paid to cleanliness. How much less reaction follows this simple procedure is seen by the rapidity of the recoveries, patients who had undergone amputation of the thigh having repeatedly left their beds on the eleventh day, the stump being guarded by a small pledget kept on by adhesive plaster. For some years past Dr. Burow has been in the habit of applying to wounds attended with abnormal discharges the acetate of aluminum lotion, which is a cheap and excellent preparation for hospital practice, removing all bad smell. So after amputation, when the discharge is considerable, he resorts to it.—*Brit. and For. Med.-Chir. Rev.*, Jan. 1867, from *Deutsche Klinik*, No. 24.

23. *New Method of Amputating at the Shoulder-Joint*.—JAMES SPENCE, Esq., Professor of Surgery in the University of Edinburgh, describes (*Lancet*, Feb. 2d, 1867) the following method of amputating at the shoulder-joint for which he claims the following advantages. 1st. The fulness and better form of the stump after the healing. 2d. In this the posterior circumflex is not divided except in its small terminal branches in front, whereas, both in the large deltoid flap and the double flap methods, the trunk of the vessel is divided in the early steps of the operation, and, retracting, often gives rise to embarrassing hemorrhage. Besides, in the case of the single flap method, the vitality of the flap must be seriously compromised, as it depends chiefly on that vessel for its arterial supply. 3d. The great ease with which disarticulation can be accomplished.

He describes this mode of operating as follows:—

"Supposing the right arm to be the subject of amputation. The arm being slightly abducted, and the head of the humerus rotated outwards, if possible, With a broad strong bistoury I begin by cutting down upon the inner aspect of the head of the humerus, immediately external to the coracoid process, and carry the incision down through the clavicular fibres of the deltoid and pectoralis major muscles till I reach the humeral attachment of the latter muscle, which I divide. I then with a gentle curve carry my incision across and fairly through the lower fibres of the deltoid towards the posterior border of the axilla, unless the textures be much torn. I next mark out the line of the lower part of the inner section by carrying an incision, through the *skin and fat only*, from the point where my straight incision terminated, across the inside of the arm to meet the incision at the outer part. This insures accuracy in the line of union, but is not essential. If the fibres of the deltoid have been thoroughly divided in the line of incision, the flap so marked out can be easily separated (by the point of the finger without further use of the knife) from the bone and joint, along with the posterior circumflex trunk, which enters its deep surface, and drawn upwards and backwards so as to expose the head and tuberosities. The tendinous insertions of the capsular muscles, the long head of the biceps, and the capsule are next divided by cutting directly on the tuberosities and head of the bone; and the broad subscapular tendon especially, being very fully exposed by the incision, can be much more easily and completely divided than in the double flap method. By keeping the large posterior flap out of the way by a broad copper spatula or the fingers of an assistant, and taking care to keep the edge of the knife close to the bone, as in excision, the trunk of the posterior circumflex is protected. The only vessel which bleeds is the anterior circumflex divided in the first incision, and here, if neces-

sary, a pair of catch forceps can be placed on it at once. In regard to the axillary vessels, they can either be compressed by an assistant before completing the division of the soft part on the axillary aspect, or, as I often do in cases where it is wished to avoid all risk, by a few touches of the bistoury the vessel can be exposed and can then be tied and divided between two ligatures, so as to allow it to retract before dividing the other textures.

In this, as in all amputations, I make a point of gently drawing out the large nerves and cutting them so short that they cannot become implicated in the cicatrix, but may be so deeply covered as to save them from liability to irritation from external influences. In cases where the limb is very muscular I dissect the skin and fat from the deltoid at the lower part, and then divide the muscular fibres higher up by a second incision, so as to avoid redundancy of muscular tissue. After arresting bleeding I bring the edges together with a few points of suture, leaving an opening at the lower and back part, through which the ligatures are brought out and the free escape of blood and other discharge permitted.

The dressing I use is very simple, being merely a flat pad of lint secured by a six-tailed split cloth, the tails being tied on the opposite side of the body.

Prof. Spence does not recommend this plan under *all* conditions. "There are," he says, "cases in which I would prefer the operation by double flap, such as those for malignant tumour, where we wish to remove all the muscular tissue of the deltoid, and leave nothing but skin flaps. In such cases a single long flap dissected from the subjacent tissues, and depending entirely for nourishment on the vascular supply of its base, is more apt to slough than two smaller ones. In a case of a large malignant tumour, for which I amputated at the shoulder about five weeks ago, and in which, along with the tumour, I removed the whole of the deltoid and a considerable portion of the great pectoral, I operated by dissecting a single large skin flap. But a very large portion of it sloughed, and though the case has gone on favourably, and the wound has nearly cicatrized, yet I feel satisfied that two smaller flaps would have given a better result; and I mention this case as an example of a class for which I think this plan of operating unsuitable. I may, however, say, after considerable experience in amputation at the shoulder-joint, that there are, I believe, very few cases in which the method I have been describing will not be found suitable, and where it is I have no hesitation in recommending it as being preferable to any other method I have ever practised.

34. *Ligature of Common Carotid Artery.*—Dr. J. J. Nason records (*Brit. Med. Journ.*, Feb. 2, 1867) a case of this in a boy who had been struck in the neck with a stable fork. Dr. N. found "on the left side of the neck a horizontal wound, from three to four inches long, with slightly inverted edges; it was about an inch and a half below the angle of the jaw, and just over the course of the carotid artery. On the right side of the neck was a darkish swelling, of about the size of half a lemon, having in its centre a darker blood-stained spot, which as nearly as possibly corresponded in situation with the wound on the left side. From the situation of the external wound, from the great loss of blood—the blood coming principally from the mouth, denoting injury to the pharynx, from the continued ecchymosed swelling of the right side, and from his great collapse I inferred that the carotid vessel or vessels had been wounded. For a time I was unable to feel pulsation in any of the branches given off by either carotid; but, after a time, I could detect pulsation in the facial and temporal arteries of the right side, but not of the left. I summoned to my assistance my friend Dr. Rice, who agreed with me that the left carotid artery, just before the division, or the left internal carotid alone, or even in conjunction with the external carotid, had been wounded. The boy's state was one of great collapse; and, as it was doubtful whether the wounded vessel was the common carotid, or one or both of its chief divisions, and it was expedient to add as little more to the shock as possible, and to save every drop of blood, we resolved to tie the common carotid in the part most accessible, namely, in the lower part of the carotid triangle. The operation was performed without much difficulty, and without the loss of a drachm of blood; it was not followed by

paralysis, or any untoward symptom. The ligature came away on the twelfth day, the wound gradually healed up, and the boy steadily progressed to convalescence, and has remained perfectly well ever since."

35. *Lithotomy*.—The *British and For. Med.-Chirurg. Review*, for January of the present year, contains an interesting article on this operation by Mr. W. F. TEEVAN, Surgeon to the West London Hospital, in which the author endeavours to decide some points still in controversy in regard to the modes of performing the operation.

Mr. T. advocates the use of the sound resembling a lithotrite, in preference to that similar in shape to a catheter. If a short-beaked sound be used, he says, its end is so very free that it insinuates itself into the vacuities of the bladder, and a stone rarely eludes discovery. He states that a stone may be struck, and no metallic click heard. He has seen two calculi, composed of alternate layers of fleshy and earthy matter, with a fleshy covering. The promontory of the sacrum is sometimes struck, which gives a dull sound; and in such cases the operator, on opening the bladder, has been surprised to find no stone. Mr. T. considers it very important that the staff be firmly held; the steadier the staff, the easier and speedier will the surgeon's knife glide into the bladder. When requested to hold a staff, Mr. T. says he always uses "both hands, one being placed over the other, the lower one resting on the crest of the pubis. In this way the staff can be held with a fixity which is unattainable by any other method. The penis can be compressed into a very small space against the crest of the pubis, and another assistant can keep the scrotum out of the way. Most staffs are too long; the shorter the staff, the steadier it will be."

Mr. T. advocates the use of a knife of the same breadth, both for boys and adults, as in either case we desire to introduce the same sized instrument, the left forefinger. "If," he says, "the breadth of the ordinary lithotomy knife were the same as that of the gorget, the surgeon would never experience any difficulty in reaching the bladder, and the parts would escape that bruising and laceration which give rise to suppuration, phlebitis, and pyæmia."

Mr. T. considers that the reason of the stone so often escaping from the forceps is that the blades are not sufficiently bent inwards, or bellied.

Mr. T. advocates commencing the incision in the perineum low down, *i. e.*, one inch above the anus, as the surgeon can then thrust in his knife more boldly than when the high incision is resorted to, and can generally at the first incision hit, or get close to the staff.

The special point which Mr. T. lays down is, that "*The limited incision of the prostate in lateral lithotomy is wrong in principle, and mischievous in practice.*"

Mr. T. states that he has experimentally ascertained the following facts:—

"1. The prostatic urethra will only admit the terminal joint of the forefinger without laceration.

"2. If the introduction of the forefinger be continued, the mucous membrane splits longitudinally as the second joint is passing through. The urethra splits in the roof because the convexity of the joint is pressed against that part. In lateral lithotomy the incision into the prostate prevents laceration of the roof of the prostatic urethra.

"3. If a stone half an inch in diameter be extracted through a prostate in which no incision has been made, the mucous membrane of the floor of the urethra is lacerated and the prostate slightly torn; the capsule remains perfect, but the orifices of the ejaculatory ducts can seldom be distinguished.

"4. If a calculus half an inch in diameter be extracted through a prostate which has been partially incised, as in lateral lithotomy, the capsule and orifices of the ejaculatory ducts remain perfect.

"5. Stones upwards of half an inch in diameter, when extracted by the median operation, lacerate more or less the prostate and its capsule, and obliterate the orifices of the ejaculatory ducts.

"6. Calculi of one inch in diameter and upwards, when extracted through a prostate which has only been partially incised, in the lateral operation, lacerate

rate the gland and its capsule completely in a direction downwards and outwards, and obliterate the orifices of the ejaculatory ducts.

"7. If a calculus be extracted through an aperture which was made by cutting and not by laceration, then the orifices of the ejaculatory ducts can always be distinguished.

"8. The so-called dilatation of the prostate is complete rupture.

"9. When a stone is extracted from the bladder by means of a limited incision and subsequent so-called dilatation, either in median or lateral lithotomy, there is always more or less eversion of the gland; that is, in such cases, the stone has a tendency to enucleate the gland from its capsule in a direction forwards. Thus, therefore, only a very small stone can be extracted through a partially incised prostate without completely lacerating the gland and its capsule. In fact, if an ordinary sized stone be extracted, either in median or lateral lithotomy, by a limited incision, the prostate is found split into two, the halves being held together by a remnant of the capsule about half an inch broad. Some persons would object to deductions drawn from experiments made on the dead body, and say that results obtained after death must be very different to what happens after lithotomy on the living. It must, however, be remembered that the mechanical properties of the fasciæ are not altered for some time after death, and therefore experiments made a few hours post-mortem afford similar results to those which would have ensued on the living.

"From a personal examination of all the pathological museums in London, I have ascertained the following facts:—

"1. That out of the very many specimens and bladders and prostates after lithotomy, there is no unequivocal specimen which shows that an ordinary sized calculus can be extracted from an ordinary sized prostate, by means of a limited incision and the subsequent so-called dilatation, without complete rupture of the prostate and its capsule.

"2. That in extracting ordinary sized calculi through the prostate, not only is the gland and its capsule completely ruptured, but the rent extends into the bladder as far usually as the orifice of the left ureter.

"3. That when there has been much laceration and bruising of parts, the orifices of the ejaculatory ducts can no longer be distinguished.

"4. That there are several bladders and prostates of persons who have lived upwards of ten years after lateral lithotomy, and in such specimens the cicatrix can be seen extending into the bladder nearly to the orifice of the left ureter.

"5. That a fistula in the bladder communicating with the rectum is not an uncommon occurrence after lithotomy—that such fistula is the result of laceration, and would not appear to be of much consequence.

"6. That in ordinary lithotomy, the prostate is completely split into two, the halves being generally held together by a remnant of the capsule about half an inch broad.

"7. That the most frequent cause of death after lithotomy would seem to be extensive suppuration, followed by phlebitis and pyæmia, set up by the laceration and bruising of parts.

"8. That infiltration of urine after lithotomy must be regarded as a surgical curiosity.

"It will thus be seen, whether cases of lithotomy on the living or dead be examined, the same conclusion will be arrived at—that an ordinary sized stone cannot be extracted through an ordinary-sized prostate, by means of the limited incision and subsequent so-called dilatation, without complete rupture of the gland and its capsule.

"A subject of very great importance which has not yet received the attention of the profession, is the occurrence of impotence after lithotomy. When it takes place, it is from laceration of the mucous membrane around the orifices of the ducts, and their subsequent plugging. My objection to the median operation is that the mucous membrane generally gets lacerated in the floor of the urethra, and the prostate occasionally split into halves in the paths of the ducts.

"The following are the conclusions at which I have arrived:—

"1. When lateral lithotomy is performed, the stone ought always to be cut out, and not torn out.

"2. That the median operation is not justifiable for the extraction of calculi which are upwards of half an inch in diameter; for if such sized stones be removed by that process, obliteration of the orifices of the ejaculatory ducts and permanent impotence will result.

"Lateral lithotomy in the boy is such a very successful operation, and if performed without laceration of the parts causes no injury to the seminal ducts, that no possible advantage can be gained by substituting the median operation for it, inasmuch as that procedure cannot be accomplished in the child without the laceration of parts, and such laceration will occur in the very spot we ought to avoid—namely, in the floor of the urethra. The only cases in which I consider the median operation eligible, is in those rather rare instances in adults in which we have a small stone and an enlarged and diseased prostate, and in which lithotripsy may not be considered advisable."

36. *Ovariectomy; Pedicle secured by Silver Wire after the Failure of the Actual Caustery to arrest the Hemorrhage; Cure.*—Dr. J. MARION SIMS records (*British Medical Journal*, Jan. 19, 1867) a very instructive case of this; the subject of it was an American lady residing in Paris, 52 years of age, the mother of six children. She had always enjoyed good health until the spring of 1865, when she had occasional attacks of nausea and vomiting, which resisted all remedies, when she consulted Dr. Arnal, who diagnosed an ovarian tumour on the right side.

November 9th, Dr. Sims saw the patient, in consultation with Dr. Beylard. She then measured 53 inches around abdomen, and 23 inches from ensiform cartilage to pubes. Dr. S. diagnosed a multilocular ovarian cyst, probably without adhesions, and advised its extirpation as the only hope of a cure.

"The operation was performed on Sunday, November 18th, at the *Hôtel du Pavillon de Henri IV.*, at St. Germain. I was assisted by Drs. Beylard, Johnston, Darby, Buckler, Lailler, and Thierry-Mieg. Dr. Beylard administered ether. An incision, three inches long, was made in the usual way through the abdominal walls, and the cyst was exposed. The trocar was introduced, and emptied one of its largest compartments of about ten pounds of a dark brown serous fluid. Five other compartments of the cyst were in turn punctured; but in two of them the fluid was too thick to flow through the tube of the trocar. The other three gave vent to about twenty pounds more of fluid. To expedite the operation, the internal incision was enlarged to the extent of five inches, which allowed me to extract the remainder of the tumour *en masse*. It was attached to the right broad ligament. The pedicle was short and broad. When spread out in the clamp, it measured four and a half inches in width. Its veins were large and tortuous. It was severed by the actual caustery, according to the plan of Mr. Baker Brown.

"On removing the clamp, blood began to ooze from the end of the line of canterization farthest from the fundus uteri. The bleeding seemed to be chiefly from the open mouths of the large veins. An inch of tissue including the veins was encircled in a loop of silver wire, which was drawn tightly, twisted firmly, and cut off close to the twist. The mere mechanical manipulation of doing this unfortunately tore open the whole extent of the line of canterization, and blood oozed out from every part of it. To secure this long line (nearly four inches) of bleeding surface, it was necessary to introduce five other loops of silver wire, embracing as many segments of the bleeding pedicle, each of which was twisted separately and cut off close, as before described. The uterine artery spouted furiously, and required a special ligature. After the bleeding was wholly controlled, the pelvic and abdominal cavities were thoroughly cleared of the fluid that unavoidably escaped into them, and the external incision was closed by a continuous suture of silver wire. The whole of the peritoneal membrane, whether lining the walls of the abdomen or investing the intestines, was deeply congested, and had a red granular appearance. The tumour had no adhesions; and, notwithstanding the appearance of the peritoneum, there was no unusual amount of serum in its cavity. She was fully under the influence of ether only during the early period of operation, and recovered easily from its immediate effects. Reaction was established in two hours with a pulse at 108

which at midnight fell to 96. She vomited only twice during the afternoon, and was wholly free from pain or suffering of any kind.

"About two hours after the operation, the urine (fourteen ounces) was drawn off by the catheter; but after this she passed urine spontaneously and freely. The bowels were moved spontaneously on the third day. She slept every night without anodynes, and took nourishment with a relish from the first day.

"There was nothing whatever worthy of remark during the convalescence. The external wound healed perfectly by the first intention. The silver sutures were removed on the tenth day after the operation. She sat up and walked across the room on the eleventh day, and on the twenty-second day she returned to her house in Paris perfectly well.

"The solid part of the tumour removed *en masse* weighed eleven pounds, and the fluid thirty-two pounds. Dr. Johnston and others present estimated the loss of fluid during the operation at eight or ten pounds. The whole amount was probably near fifty pounds.

"In one of the cysts the fluid was straw-coloured, and another coffee-coloured, and in one it was as dark as sugar-house molasses; in others it was of the consistence of jelly.

"The operation of removing the tumour lasted twenty minutes, and the time taken in securing the pedicle was about twenty minutes more.

"Ever since the first introduction of the use of silver sutures in 1849, I have advocated the application of the metallic ligatures to the pedicle in ovariectomy. In 1858, this view was held forth in my paper, On Silver Sutures in Surgery. Since then I have carried it out in practice.

"Dr. Nélaton performed the operation of ovariectomy in Paris in May, 1864, on a patient of Sir Joseph Oliffe, and kindly allowed me to secure the pedicle with silver wire. It was transfixed by a double wire, which was cut in two, and each half was twisted tightly on opposite sides of the pedicle. This was then cut off near the ligatures and returned into the cavity of the abdomen, and the external wound was closed by silver sutures. Unfortunately for the poor patient, she died on the fifth day after the operation, of blood-poisoning from peritoneal exudation. But, fortunately for science, a *post-mortem* examination showed the metallic ligatures entirely imbedded in the tissue of the pedicle, and so perfectly sacculated that I was obliged to cut into its structure to find them.

"The wire had cut into the tissue, and this had healed behind its track, and thus it was wholly covered up and hidden from view. I was able to foretell what would be its method of action by observation from analogy. In 1850, by means of a silver wire, I made the effort to strangulate a warty excrescence on the cheek of a lady sixty years old. It was of about the size of the end of the little finger, and projected at least half an inch above the surface. It was hard to the touch, and of a reddish tint. On tightening the wire at its base, the top became of a deep purple colour, showing that its circulation was momentarily arrested. On visiting my patient the next day, I was surprised to find the excrescence of its original colour, without the least sign of a disorganizing process. On the contrary, its circulation was going on as vigorously as before the application of the wire. On a minute examination, I found that the wire had cut a bed for itself entirely around the structure embraced, and that the tissue so cut had overlapped the wire and healed over it, thus encasing or sacculating it completely, and this within the short space of twenty hours. Of course, it was a mistake to apply the wire at all with the idea of producing a slough, and it was clipped and drawn out."

"It was a great improvement," Dr. S. remarks, "in the operation of ovariectomy when, a short time ago, the pedicle was drawn out and secured by a clamp externally to the abdomen, instead of being tied with a cord, as formerly, which was then allowed to hang from the lower end of the external wound, thus acting the part of a seton and exciting the action which it should have been our object to prevent. But I think a still greater advance is made, when we can secure the bleeding pedicle in such a way as safely to replace it within the abdominal cavity, and thus allow the external wound to be healed throughout its entire length by the first intention.

"For this desirable end we now have two methods: the one of treating the

pedicle by the actual cantery, so successfully practised by Mr. Baker Brown; the other by means of the metallic ligature.

"The actual cantery does not always succeed; and the case above described clearly proves that we have a safe and sure resource in the silver ligature."

OPHTHALMOLOGY.

37. *A Modification of the Operation for Strabismus.*—Dr. RICHARD LIEB REICH, Professor of Ophthalmology, Paris, in a memoir on this subject, a copy of which he has politely sent us, states: "It is well known that, if the internal rectus muscle be divided in the manner now generally practised, it is possible to correct a squint of from 2 to 2½ lines in adults, and from 2½ to 3 lines in children. But, if the deviation exceed this extent, it will be necessary to perform two, three, or even more, successive operations."

To remedy, if possible, these defects, Prof. L. determined to investigate, with greater accuracy, *first*, the anatomical relations of the muscles, with regard to the capsule of Tenon, the sclerotic, conjunctiva, caruncle, &c.; and, *second*, the mechanical effect of the operation for strabismus.

From this investigation he has been led to call special attention to three points, as being particularly important with regard to the performance of the operation for strabismus.

"1. The connection of the muscle with the capsule of Tenon is twofold. On the one hand, there is the annular connection of the posterior capsule and its sheath-like processes (which are reflected towards the orbit, with the belly of the muscle; on the other, the firm adhesion of the anterior half of the capsule to the surface of the end of the muscle, which penetrates into the capsule.

"2. The conjunctiva is firmly connected with the outer surface of the capsule of Tenon, from the edge of the cornea to an irregularly circular, sharply defined, marginal line; and, consequently, it stands in a very important relation to the muscles of the eye.

"3. The caruncle, together with the semilunar flap, rest upon a band-like ligament, which passes from the capsule of Tenon toward the edge of the orbit. Now, when the internal rectus is contracted, and the eye rolled inwards, this band is rendered tense; and the caruncle, which is fixed to it, is consequently drawn in towards the internal surface of the orbit. But the outer edge of the caruncle, together with the semilunar fold and an adjoining portion of conjunctiva, are drawn backwards into a furrow. This is partly due to the fact that, during the movements of the eye, the conjunctiva lies, up to a certain point, in close apposition to the eyeball; and partly also to the fact that, when the muscle contracts, and on account of its connection with the anterior half of the capsule, draws the latter backwards, it is necessarily followed by the conjunctiva (which is likewise connected with the capsule, by the semilunar fold and the caruncle.

"From a consideration of the first of these three points, we learn with regard to the mechanical effect of the operation for strabismus, that a division of the insertion of a muscle can only be brought about by a division of the portion of anterior capsule which covers the muscle. For this portion, which passes over the muscle to become attached to the sclerotic just before the insertion of the tendon, keeps the muscle in a fixed position with regard to the sclerotic; so that, if we attempt to sever the tendon from the sclerotic without dividing this portion of the capsule, the tendon would become reunited exactly at its original point of insertion; so that, in fact, it would not have receded at all. It would, however, be not only very difficult, but almost impossible, to avoid incising this portion of the capsule, as, on account of its intimate adherence to the insertion of the muscle, it is always divided simultaneously with it. Even in the subconjunctival operation, although the conjunctiva which covers this portion of

the capsule is left intact, the capsule itself is divided along the whole breadth of the insertion of the muscle. This vertical incision of the capsule of Tenon, which always takes place simultaneously with the tenotomy, is the cause of the retrocession of the anterior part of the capsule covering the muscle, and of the annular portion of the capsule which keeps the muscle fixed, and consequently, also, the retrocession of the muscle itself. By increasing the length of the incision in the capsule (Graefe's division of the lateral processes), we may certainly produce a somewhat greater retrocession; but, owing to the second point mentioned above, it cannot be very extensive. For the connection of the conjunctiva with the capsule does not permit a more considerable retrocession of the latter, unless we make an extensive vertical incision in the conjunctiva, analogous to that in the capsule, and thus jointly divide the conjunctiva, capsule, and tendon. Such a proceeding is, however, accompanied by considerable disadvantages. On account of the connection between the muscle, capsule, and caruncle, the divided muscle draws the caruncle and the semilunar fold backwards and inwards, as well as that portion of the conjunctiva which was divided by the vertical incision. In consequence of this, these parts assume the same position when the eye looks straight forward, which they do in the normal eye when it is turned very far inwards. At the same time, the distance between the semilunar fold and the inner edge of the cornea is increased, as also the portion of sclerotic visible at the inner angle of the eye: and this gives to the eye that peculiarly disagreeable appearance which was so characteristic of the old operation."

Based upon the above considerations, Prof. L. recommends the following modification of the operation for strabismus:—

"If the internal rectus is to be divided, I raise with a pair of forceps a fold of conjunctiva at the lower edge of the insertion of the muscle; and, incising this with scissors, enter the points of the latter at the opening between the conjunctiva and the capsule of Tenon: then carefully separate these two tissues from each other as far as the semilunar fold, also separating the latter, as well as the caruncle, from the parts lying behind. When the portion of the capsule which is of such importance in the tenotomy has been completely separated from the conjunctiva, I divide the insertion of the tendon from the sclerotic in the usual manner, and extend the vertical cut, which is made simultaneously with the tenotomy, upwards and downwards—the more so if a very considerable effect is desired. The wound in the conjunctiva is then closed with a suture.

"The same mode of operating is pursued in dividing the external rectus; and the separation of the conjunctiva is to be continued as far as that portion of the external angle which is drawn sharply back when the eye is turned outwards."

Prof. L. claims the following advantages for his proceeding:—

"1. It affords the operator a greater scope in apportioning and dividing the effect of the operation between the two eyes.

"2. The sinking back of the caruncle is avoided, as well as every trace of a cicatrix, which not unfrequently occurs in the common tenotomy.

"There is no need for more than two operations on the same individual, and therefore of more than one on the same eye."

38. *Quinia in Rheumatic Iritis*.—M. GALEZOWSKI had under treatment a young man affected with rheumatic iritis of the right eye, subsequent to rheumatism. The disease had been treated in various ways during six months, when M. Galezowski applied sulphate of atropia to the eye, and gave quinia in large doses internally. The disease was cured in a fortnight. In another case, also of rheumatic iritis with painful swelling of the right foot, M. Galezowski gave sulphate of quinia successfully. From these and similar facts, he concludes that sulphate of quinia is one of the most efficacious remedies for rheumatic iritis.—*Brit. Med. Journ.*, Jan. 19, 1867, from *Gaz. Méd. de Lyon*.

39. *Pathology of Hemeralopia*.—The *Ophthalmic Review* for October last contains an interesting paper by Prof. A. QUAGLINO, of Pavia, translated from

the *Giorn. d'Oftalm. Ital.*, vol. viii. p. 23. Prof. Q. states that night blindness is a very common affection during spring and summer among the Italian peasantry, and soldiers in camp, sometimes affecting whole regiments of the latter, so as to render them unfit for service between twilight and dawn of day.

Prof. Q. thinks it important to call attention to this affection, with the view of showing that, instead of its being the nervous disease it was formerly considered, it is rather a symptom of a material and recognizable morbid process, which, though slight, and susceptible of spontaneous cure in the early stages of the disease, provided the patients withdraw themselves from the action of bright light, yet may be in time and after repeated recurrences, the point of origin of more serious alterations of the retina and optic nerve that may eventually lead to amblyopia or even amaurosis.

Prof. Q. gives the following as the constant alterations which he has found, on examination with the ophthalmoscope, in thirty soldiers. They were observed at different epochs from the commencement of the disease—some on the first, second, or third day, and others after weeks or months:—

"1. Whitish-gray haziness of the whole retina, especially around the disk and along the retinal vessels, after invading the disk itself. This haziness is more or less intense according to the duration of the disease, and the degree that the vision has become impaired. In consequence of it the subjacent vascular layer of the choroid is distinguished with much difficulty by the ophthalmoscope. The retinal haziness gradually disappears in soldiers after some days in a dark room, or after other treatment.

"2. Manifest congestion of the veins; they are also tortuous, and contain a dark blackish blood, seeming almost coagulated.

"3. The central arteries are often enlarged in the region of the disk, but when the disease has lasted for some time they appear lessened and hidden here and there in the parenchyma of the retina, which presents a thickened appearance.

"4. In many cases, when the disease is recent, the disk looks red or roseate through most delicate injection of the capillaries and consequent dilatation of collateral vessels. In these cases also the retinal vessels, and even vessels of the ciliary apparatus, appear redder and more swollen.

"5. The obscuration of the retina is in time dissipated, the purple transparency being restored; but both the arteries and the veins become smaller and more slender, and the contours of the disk lose their regularity and are fringed by streaks of dark pigment. Many times the normal fibres of the optic nerve become opaque, so as to render the bounds of the disk indistinguishable from the rest of the retina, which is also slightly clouded.

"6. When the disease has many times recurred, and the patient become amblyopic, the appearances first mentioned are usually replaced by those of atrophy of the vessels and disk, attended by the characteristic white reflection of the nervous substance, more or less marked.

"It results from the alterations described that the process on which the hemeralopia depends is seated in the extremity of the optic nerve, in the retina, and in its vessels; and that the affection must be considered as a venous stasis, accompanied by serous infiltration of the retinal substance, and of the nervous fibres of the optic nerve, which form the disk.

"This serous exudation impairs the transparency of the retina, renders it grayish and consequently visible, and compresses the layers of rods and cones, making them less apt to receive the rays which emanate from objects illuminated by too weak a light, such as that of twilight or of night.

"The symptom of hemeralopia is not confined exclusively to this single species of retinitis, and does not constitute, *per se*, a special form; for it is often found in syphilitic retinitis, in serous retinitis, in amaurosis from progressive atrophy of the optic nerves with or without pigmentary degeneration, and sometimes also in arthritic or rheumatic choroiditis, in which there is an evident compression of the bacillary layers.

"Hemeralopia is a frequent symptom in cases of pellagra, terminating sometimes in progressive atrophy of the optic nerves, a result promoted and sustained by chronic pneumo-galitis, which is developed in many cases, and the

occasion of all those other nervous perturbations accompanying the disease to which we are referring.

"The predisposing causes of this disease are no doubt those abnormal conditions of the abdominal viscera which favour venous stasis in the region of the superior cava, such as long-continued intermittent fevers which have left infarctus in these viscera, gastric fevers, and the scorbutic dyscrasy. The exciting causes are the dazzling light of the sun, the white reflection of the earth, or the glittering one of water, through which the retina, by excess of stimulus, becomes irritated and congested. Probably some part is also played by suppression of perspiration and the rheumatic poison.

"Hemeralopics have generally a leucophlegmatic appearance, are of a yellow colour, or even a decidedly jaundiced hue, showing the disturbed action of the liver, and have swollen gums readily bleeding.

"Hemeralopia frequently recurs in soldiers who return to camp too soon after treatment, and in the same season in which the disease attacked them. It often supervenes in spring or in the following summer. We have observed cases in which the patients were hemeralopic for the fourth or fifth time, and who yet recovered perfectly."

MIDWIFERY.

40. *Protracted Utero-gestation*.—Dr. C. JOYNT relates, *Dublin Quart. Journ. Med. Sci.*, Nov. 1866, a case of this, which seems to have been most carefully investigated and with the result of showing that the minimum duration of pregnancy must have been 317 days, or about six weeks more than the average. The subject of the case was a lady about 30 years of age, who had been pregnant six times, the pregnancy on two occasions ending in miscarriage. She suffered from excessive menstruation, and neuralgia of the ovaries, and was also subject to frequent hystero-epileptic fits.

41. *Postural Treatment in Prolapse of Umbilical Cord*.—Dr. J. G. WILSON, Lecturer on Midwifery in Andersonian University, in an article in the *Glasgow Medical Journal* for Nov. 1866, extols the postural treatment in prolapse of the umbilical cord first described by Dr. J. G. Thomas, of New York, and relates two cases in which he resorted to it with success. This method he says is "so simple and so safe, 'and so in accordance with common sense,' that I believe it will commend itself to general adoption, and that it will ere long supplant and supersede all the modes of management commonly had recourse to in cases of descended cord."

42. *Fracture of the Pelvis in a Pregnant Woman; Recovery*.—Dr. FAIRBANK reported to the Obstetrical Society of London, the case of a woman who in the sixth month of her pregnancy was crushed between the wheel of a wagon and the parapet of a bridge. Immediately on this happening there was a gush of blood from the vagina, and on removing the woman to her home, which was not far off, Dr. Fairbank was able to find that the pelvis was fractured, the fracture passing through the horizontal ramus of the pubes into the obturator foramen. The patient was chilly all over, her pulse was slow, and she was very pale. This happened in the afternoon, and when visited later her pulse was found to be rather better, but as the evening wore on she became more and more restless, the pulse rose to 150 per minute; still she was able to pass urine. She spent a bad night, with occasional vomiting, and in the morning her abdomen was tense, her countenance anxious, and no fœtal sound could be heard. She got several doses of opium, and warm fomentations were applied over the injured parts. On the third day she was still more feeble, and her pulse was softer, but the vomiting still continued, and there was a certain amount of tenderness over the abdomen. On the 4th she was better, the pulse was 100, urine natural, and a strong belt was applied so as to compress the pelvis; from this she felt great

relief. She continued to improve, and in two months she was able to walk about, but the right side of the pelvis continued flatter than the left. Three months after labour came on, and the fetus was quickly expelled. When examined it presented all the appearances of only having reached a six months' maturity. It came to the knowledge of the reporter that she had been delivered of another child twelve months after this, a midwife having been employed at first, but, from the tedious nature of the case, that a surgeon had been called in. Too much time had been wasted before application had been made to this gentleman, and the patient sank after the child had been brought into the world.—*Med. Times and Gaz.*, Jan 19, 1867.

43. *Criminal Abortion in India*.—Dr. SHORT, of Madras, sent to the Obstetrical Society of London, a report as to the frequency of criminal abortion in India. In 1863, 27 individuals were condemned for being concerned in such crimes, which, considering the amount of cases that escape detection, shows how common it must be. He detailed the symptoms which followed abortion, being simply those of recent delivery in a more or less mitigated degree, and then proceeded to enumerate the substances employed for procuring the premature expulsion of the fetus. These were, first, bamboo leaves pounded in a mortar, the juice of which is said to be extremely powerful, generally causing the immature ovum to be expelled in from two to three days. The juice of the *Euphorbia Tirucali*, when applied to the os by means of a rag on the point of a stick, is also said to insure this in from twelve to twenty-four hours. Other species of the same genus are employed in like manner, and for a similar purpose; so also is the *Calopterys gigantea*. The root of the *Pambago Zeylanica* is employed with a like intention, both locally and through the stomach; when applied in the former manner, the root is often shaved down to a taper point, and so introduced into the os uteri. In one case which came under this gentleman's notice, the base of the uterus was perforated in three places, as a result of the local application of the hard roots or the impregnated cloth upon a stick.—*Ibid.*

44. *Ovarian Pregnancy; Delivery of the Fetus per Anum; Recovery*.—A merchant's wife, aged 35, of Berlin, was, as primipara, in 1856, safely delivered. In November, 1862, she had severe pain in the left hypogastric region, which showed an egg-shaped swelling. The catamenia ceased for nine weeks, but pregnancy was not made out. The patient was then seen by Dr. Hildebrandt, who made the diagnosis of a pregnant (?) uterus, without, however, being able to give a decided solution of the question. At the next consultation, an entirely normal pregnancy was diagnosed by one physician, and denied by the other. In the seventh month of pregnancy, the patient took a great many laxatives on account of constipation of the bowels. In the meantime Dr. Julius Beer was called in, who examined the uterus very closely, and gave the opinion that the woman was not pregnant, but that an abortion had taken place some time before. The tumour in the left hypogastrium he did not find. On January 2d, 1864, after an almost colliquative diarrhoea, with very great pain, two symmetrical skull-bones, the parietal bones of a fetus, were passed *per anum*. Pathological anatomy has shown that in such cases a sac is formed, which is united with a loop of intestine, whereupon this intermediate partition-wall is broken through to allow the bones to pass. The patient remains well and without pain.—*Brit. Med. Journ.*, Feb. 23, 1867, from *Gesell. schrift für Heilkunde*.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Structure and Functions of the Parent Gland Cells, and Causes of Certain Forms of Rheumatic Disease.

We have received from Professor J. H. SALISBURY, of the Charity Hospital Medical College, Cleveland, Ohio, a paper entitled "*Some Microscopic Observations and Experiments connected with the Study of the Structure and Functions of the Parent Gland Cells, and the Development of the various Causes of the several Types of Rheumatism, with their Classification and Treatment. Also some Observations and Experiments bearing upon a serious class of derangements excited by causes that under other conditions produce certain forms of Rheumatic Disease.*"

Prof. S. maintains that "Rheumatism is not a disease arising always from one and the same cause, and amenable, in all its varieties, to one and the same kind of treatment. The word Rheumatism should be the generic name only of a number of pathological conditions, each one of which has a distinct cause possessing distinguishing characters that are specific.

"As long as the Parent Gland Cells organize normal products in the normal quantity, no such thing as rheumatism could possibly occur. As soon, however, as these normal conditions are disturbed, the physiological balance is deranged and pathological conditions arise, at first functional, but which continued long enough tend to organic changes.

"We are all of us more or less constantly exposed to conditions which have a tendency to disturb the physiological functions.

"We have but little control over the cell elements and the filamentous tissues formed by the metamorphoses of these cells after they have been organized and have escaped from under the influence of the parent gland cells. It is upon the parent gland cells that all healthy and diseased impressions are made; and it is to these cells we must look for diseased states, and to these we must address our remedial agents if we expect to remove successfully the causes of pathological derangements.

"When a case comes to the physician, very frequently the primary causes of disease have ceased, and he has only to do with the resulting disturbance, which now, to all intents, is the cause. If, however, the primary causes are still in force, these should be first removed, and secondly, the results, or the diseased states of the gland cells sought out, and means resorted to, which will, in the most direct manner, restore the healthy functions.

"Each individual parent gland cell has all the elements of an independent organism possessing a vitality, independent of that of the systemic life. Each cell feeds, digests its food, assimilates it, grows, organizes, and eliminates. In its normal condition it organizes those cell, and filamentous, and other products that are needed for the physiological tissues. When its food is imperfect, its processes of digestion, assimilation, and organization become deranged, and pathological products are the result.

"These pathological products vary with the varying conditions.

"Under certain diseased states lithic acid and the lithates are formed in

too great quantity to be kept in solution by the eliminated fluids, and hence they accumulate in certain tissues.

"Under other pathological conditions oxalate of lime is formed. This body being for the most part insoluble in the fluids eliminated, it accumulates, first in the tissue in which it is formed, and later, if the diseased states continue, it extends to the other parent gland cells and tissues, and finally the entire organism becomes loaded with this salt. In still other pathological states, cystine, another insoluble body, is formed by the parent gland cells, and this body, like oxalate of lime, not being soluble in the fluids eliminated, gradually accumulates in the various gland cells and tissues.

"Under other abnormal states the phosphates of alkalis and alkaline earths are formed, and gradually accumulate, as in the cases of cystine and oxalate of lime. Under still other conditions, two, more, or all of the pathological states previously mentioned may be present, under which circumstances we have the two, more, or all of the specific states united. Now, these are precisely the conditions that develop the causes of rheumatism. It will be seen that these causes are several, and that each is specific and must produce a peculiar type of the disease requiring special treatment.

"We then may have four or more types of rheumatism.

"These may be designated as follows:—

- | | |
|-------------------------|-------------------------|
| 1st. Liliic Rheumatism. | 3d. Cystine Rheumatism. |
| 2d. Oxalic " " | 4th. Phosphatic " " |

"The causes which, under certain conditions, produce the various forms of rheumatism, under other circumstances result in a variety of mental, paralytic, and neuralgic disturbances."

We hope, before long, to be able to lay before our readers the details of the researches and experiments of Professor Salisbury.

Case of Hemeralopia successfully treated by Strablin and Opium combined. By W. H. GARDNER, M. D., Assistant Surgeon and Brevet Major U. S. A.

Michael Carland, a private of Co. F, 10th U. S. Infantry, was admitted to hospital June 20, 1866, with chronic hemeralopia (night-blindness), with which he had been affected for over three months. He was a large, stoutly built Irishman; an iron-puddler by trade.

When he entered the hospital there was some congestion of conjunctivæ, and slight headache; bowels had not been moved for two days. There was no fever or excitement of the pulse; iris contracts or expands slowly; can scarcely see at all at night, even in bright moonlight. I ordered him cupped over each temple; to have four compound cathartic pills at bedtime, and to be placed on half diet.

During the four months which followed his admission I successively tried mercury to salivation, potass. iodid., valerianate of zinc, iron, quinia, &c.; besides counter irritation by blisters, kept open for over two months; and also strychnia, but with no beneficial result. Finally, I gave him strychnia and opium combined in the following prescription, and improvement was evident in less than one week after he commenced taking it: R.—Strychnia, gr. j; tinct. opii, ʒijj; acid. acetic., gtt. v; aqua destil. ʒijss.—M. S.—A teaspoonful each night and morning. This dose I gradually increased to three teaspoonfuls per day. A few days after the last increase of the dose he was returned to duty cured.

When he commenced to take the strychnia and opium combined, his general health was excellent; but the disease of the eyes had so progressed that he was somewhat worse than when he entered hospital. He was totally blind after sunset, and could only see the brightest artificial light as a "faint glimmer." The pupils at all times—especially, however, at night—were widely dilated, and contracted very slowly under the stimulus of light. He has now been on duty nearly two months, and has yet had no return of the disease.

Save the congestion of the conjunctivæ mentioned when he first came in, I could discover no disease of the eye externally; but having no ophthalmoscope, I could not examine the internal structure. If this union of apparent incompatibles has ever been used before in this disease, I am not aware of it, and therefore send this case for publication.

POST HOSPITAL, Fort Abercrombie, D. T.

Case of Twins—one blighted at two and a half months, the other retaining its vitality and expelled about the sixth and a half month of utero-gestation, and, three days afterwards, the blighted fetus. By V. KERSEY, M. D., of Richmond, Ind.

On the 27th day of August, 1866, I had charge of a case of premature labour. My patient believed herself to have fully completed the fifth month of gestation—possibly to have advanced a week or two in the sixth. She was promptly delivered of a male fetus, evidently premature, but, from the state of development and vital energy, the opinion was expressed that the middle of the sixth month had probably been reached. It breathed freely, and cried, though quite feebly; yet it lived only a few minutes—probably ten or fifteen—after the cord was severed. The mother was readily and satisfactorily cleared of the placenta and membranes. I estimated the length of the fetus at twelve or thirteen inches, its weight at a pound and a half. The nails were well developed, and, I think, covered full two-thirds the space from their origins to the finger-ends. The eyes were fully open, the lids being entirely free, as I think, from adherence.

On the third day after this labour, the lady in question gave birth to a miniature embryo, which the intelligent husband at once put into strong alcohol, and, at his earliest convenience, it was placed at my disposal. My observations on this embryo were made after it had been long enough in alcohol to be deprived, to a great extent, of its natural fluids; and no doubt, in some dimensions, it was greatly shrunken. On careful measurement it was found to be one inch and seven-eighths in length. The weight, immediately after taking it from the alcohol, was nineteen grains (apoth. wt.). It probably never exceeded two or three drachms when distended with natural fluids. Ossification had made some progress in the clavicles, ribs, and sternum, the maxillary, frontal, occipital, and some of the long bones. The eyes appeared as dark spots; the mouth as a large open cleft in the face. The nose and ears were not cognizable; the outlines of the toes and fingers were visible, but these members were united throughout by a web. There was no appearance of decay, nor indication that vitality had been long suspended. The age of this embryo was estimated at from two to two and a half months. The mother, in her thirtieth year, has borne seven living children at term, and suffered seven abortions. She is of a remarkably fruitful family, her grandmother having

borne sixteen, and her great-grandmother twenty-two living children, at full term, and at as many births, nearly all of whom lived to adult age.

During the pregnancy in question, the lady several times suffered from what were regarded as attacks of passive hemorrhage, which, it is obviously possible, might have been simple menstruation, after the first fecundation; but no suspicion of this kind was entertained, and the date of these attacks was not noted. The labour was attended with very trifling loss of blood; in fact, no kind of complication was observed. The idea of a double uterus was not suggested at the time of delivery, and, of course, no investigation was made in that direction; but it seems scarcely probable that this rare condition should exist in one so frequently delivered, both prematurely and at full term, without affording some indication of the fact. Future events may possibly enable us to determine this question.

It is to be regretted that the products of this pregnancy were not both subjected to critical examination at birth; but in the absence of positive facts, I have given the best estimates I can. That they were both born of the same mother, as above stated, admits of no doubt; the intelligence and probity of the parties being such as to place their statements above suspicion.

Compound Comminuted Fracture of Maxillary Bones. By J. M. SNYDER, M. D., Maple Row, Romney, Hampshire County, Va.

On the evening of the 17th of April, Capt. Richard Sloan was kicked by a horse upon the right side of the face, fracturing the lower jaw-bone. The foot of the horse came in contact with the lower jaw-bone in a horizontal direction, the full force of the blow being received between the symphysis and right mental foramen. The fracture extended in an oblique direction from the external surface of the jaw, at the first molar tooth internally, to the spina interna without displacing any of the teeth—except, perhaps, slightly, the cuspid tooth. The internal end of the fracture, involving a portion of the spina interna, was comminuted, and a small portion of the bone came away during the progress of the case. There was another fracture between the lower edge of the coronoid process and the first molar tooth; and in the space of the attachment of the mylohyoides muscle, which was distinctly transverse, and could be easily discovered by the very uneven form of the internal surface of the jaw, and the distinct irregularity of the alveolar arch. This fracture was also comminuted, but no pieces of bone came away. The fracture could be very readily reduced; but to retain it in coaptation was found to be the great difficulty. The bandages in common use for such cases, and flat corks between the teeth, together with a covering of pasteboard adapted to the shape, and made to fit the jaw, were used for a few days, but very unsatisfactorily; so that it was evident great deformity must ensue unless some more effectual method were soon adopted to prevent motion and insure permanent coaptation. The great severity of the kick produced considerable concussion and the usual concomitant symptoms, though not alarming in their character.

The Captain recollected nothing of the accident, and only remembered having been in the stable with the horse. No abrasion of the facial integuments was discernible until after some days, when a slight contusion was observed opposite the cuspid tooth, with slight ecchymosis.

The superior maxillary bone was also fractured, but not extensively; three of the teeth, viz., two incisors and cuspid, were forced from the

alveolus, and the alveolus itself was crushed to the extent of one and a half inches immediately above the anterior fracture of the lower jaw. The palatine plate was also implicated in the fracture, but without loss of substance.

I found the patient, five or six hours after the accident, suffering intense pain in the fractured part, which was much swollen. I supposed the pain was of a neuralgic character, rather than the result of any inflammatory action, for the circulation had not as yet reacted. This pain, I had no doubt, was kept up by the irritation caused by displacement of the fractured bones, and would subside after the fracture was adjusted, which I found to be the case. About twenty hours after the accident the system reacted powerfully, requiring depletory measures. VS. xxiv. ounces, saline cathartics administered for a few days, together with spts. nit. dulc. and tart. ant. et potassa, and the antiphlogistic treatment generally, until the inflammatory symptoms subsided, when I proceeded to adjust the fracture in a more permanent manner. For this purpose I had made, by a silversmith, a thin silver plate, half an inch in width, and sufficiently long to reach from the posterior external part of the second molar tooth on one side to the same point on the other side, covering the symphysis in front, and perforated with very small holes, the width of each tooth apart, and three-sixteenths of an inch from the top of the plate. After flexing it so that it fitted precisely the shape of the jaw, I applied it, and with the aid of an assistant succeeded in placing a very small silver wire around the tooth at each extremity of the plate, and drawing each end of the wire through the holes in the plate, and through the small tubes of a double silver cannula, twisted them until the bone was drawn to its normal position. Wires were also attached to some of the incisors, for the purpose of keeping the plate more permanently fixed. The plate being elastic, a constant traction was kept up from within outwards, thereby counteracting the displacing action of the mylohyoideus, pterygoid, and masseter muscles. The plate was permitted to remain fifteen or eighteen days, when it was removed. During the progress of the case, to correct fetor and encourage healthy action in the mouth, the solution of chloride of soda was frequently used with a very happy effect.

The Captain suffered from neuralgic pains of the legs, which ultimately subsided, and in thirty days he was discharged cured.

The points of interest in the above case seem to me to be these :—

1. The bone could not be retained in its natural situation by the usual method of bandaging, on account of the strong displacing action of the submaxillary muscles.

2. There being both an oblique and transverse fracture very near each other, and a distinct natural irregularity in the arch of the teeth, rendered it impracticable to retain the fractured ends of the bone in apposition. It therefore became important that some more effectual method of reduction should be adopted, and the above-described plate suggested itself as the best. The fracture never became displaced after its adaptation, and reunion was rapidly and permanently established in about fifteen or eighteen days.

Some time after the occurrence of the above case I consulted authorities on the subject of fractures of the lower jaw; and I found, very much to my gratification, in vol. ii. of Samuel Cooper's Surgery, in a note appended to page 364, the following description of a case very nearly like the one above described.

"In a very bad double fracture of the jaw, which had remained ununited and displaced nearly three months under the care of other surgeons, my brother succeeded in restoring the fragments to their proper position by the use of a silver band placed in front of the teeth, and fastened on both sides, as well as to the intercepted and loose portion of the jaw, by loops of wire twisted tightly around the teeth. Bandages and external dressings had all acted injuriously in this case, by forcing the fragment which was intercepted between the two fractures into the cavity of the mouth. Soon after these were laid aside, and while the silver band was alone depended on, the fractured surfaces began to reunite, and in less than a month the parts were perfectly consolidated."

Parotitis with Sloughing of the Integuments of the Neck. By S. J. RADCLIFFE, M. D., of Washington, D. C.

A. Fisher, private Co. B, 62d Penn. Vols., æt. 23, stout built, of rather phlegmatic temperament, was admitted into U. S. A. General Hospital, Div. No. 1, Annapolis, Md., July 3, 1866, suffering from a slight gunshot flesh wound of the thumb of the right hand, which soon healed. On the 15th he was attacked with a slight chill, followed by febrile action, with pain, heat, and swelling under both ears, stiffness of the jaws, and slight difficulty in swallowing. The swelling soon increased rapidly downwards and forwards, as well as upwards, making the face and neck hideously large and deformed. On the 5th day, abscesses having formed on both sides, the left opened spontaneously by several small sieve-like orifices externally, extending a little below the gland and nearer the trachea, and also internally, and discharged much highly offensive, dark, ichorous matter and altered pns, of an irritative character, much of which burrowed under the integuments along the course of the sterno-mastoid muscle, downwards, sloughing away the entire integumentary tissues for a space two inches in diameter, and exposing the muscles of the left side of the neck plainly to view. The right now made a communication with the left at the lower part of the opening under the integuments of the right side of the neck, and the discharges issued through the same opening, attended by very little sloughing or discoloration of the skin, the discharge seeming to be of a healthier nature than that from the left. Deglutition was very difficult and painful, and the discharge from the mouth was as offensive as that from the external opening. The whole contour of the face was distorted, and the muscles of the neck were unyielding and tender to the touch. He had a constant feeling of suffocation, and the dyspnoea was so great at times as to cause alarm for his safety—a recumbent position could not be taken without great suffering. He had a furred tongue and quick pulse most of the time, and the discharges caused rapid emaciation. By the 19th of August his symptoms were altogether better: the swelling had subsided, the sloughs separated, and the edges of the tissues were clean and healthy, the discharge less and normal, deglutition better, appetite good, and his general health greatly improved. He soon recovered after this date, becoming very fleshy, the loss of the integumentary tissues being repaired by cicatrix, and the only bad sequelæ being stiffness of the neck, with feebleness of the lower extremities, a partial loss of motor influence, giving him a waddling motion in walking, and causing him to feel a little top heavy. He was sent to Convalescent Hospital, Annapolis Junction, Oct. 29th, 1862. He had a general tonic and supporting stimulating treatment; his diet consisting of beef-tea, milk, mush and milk, milk punch, broths, etc., and the free use locally of dil. chlor. sod. and dil. nitric acid. There was no distinct hospital gangrene in the hospital at the time, but a number of sloughing wounds.

Case of Puerperal Convulsions. By WILLIAM T. TAYLOR, M. D., of Philadelphia.

July 12th, 1866, I was requested to see Mrs. W. J. W., aged 22 years, pregnant with her first child. She was suffering greatly with headache, lower limbs much swollen, full and hard pulse. Ordered a dose of citrate of magnesia, which operated several times and relieved her head.

On the evening of the 14th she again complained of severe pain in the head, attended with vertigo, for which six cups were applied to the back of the neck. At midnight I was summoned again; she was insensible and convulsed. Dr. Norris, a neighbouring physician, who had been called upon in the emergency, told me that she had had a previous fit. Finding her pulse full and hard, with oppressed breathing, we bled her freely from each arm to the amount of three pints, which reduced the pulse, relieved the lungs, and arrested the convulsions. One fit occurred during the bleeding. On vaginal examination there were found no signs of labour. Her insensibility was so great that touching the cornea produced no impression. Her case appeared hopeless. Not deeming it prudent to deplete her further, an injection of half an ounce of spirits of turpentine in molasses and warm water was administered every two hours, until she had a copious evacuation, and ice-water was kept constantly to the head.

July 15th, 9 A. M. Pulse much lower, face pallid, extremities not so much swollen, still insensible. On vaginal examination the os uteri was found beginning to dilate, and labour commencing. 2 P. M., the pains quite active and regular, bladder empty, os fully dilated, the vertex presenting in the first position, at the superior strait. The uterine contractions soon became very powerful, but with very little effect on the head, which was large. After waiting half an hour applied the forceps and delivered, but the extraction of the shoulders required the united efforts of Dr. N. and myself. The child was dead; there was some exfoliation of the skin of the head, neck, and scrotum. To insure contraction of the uterus an ounce of the wine of ergot was given, and the placenta removed; the hemorrhage was very slight, but as patient was exhausted gave her some brandy and water, and applied a bandage. No signs of consciousness yet; accordingly ice in a bladder was applied to the head, and she was watched constantly until my return. 6 P. M. Has passed some flatus from the bowels, her abdomen is soft, her tongue furred, and pulse feeble, but she is still unconscious, and has considerable jactitation. Gave a teaspoonful every hour of the following: R.—Liq. morph. sulph., ext. valer. fl., āā ḡss; aq. camph. ḡj.—M. After taking three or four doses she became quiet and slept.

16th. Has passed a quiet night; pulse somewhat stronger; skin moist; tongue slightly furred; the abdomen soft, with some tenderness on pressure; the uterine hemorrhage small. She had urinated and defecated, showing for the first time signs of consciousness. This morning she swallowed thin oatmeal gruel with brandy. The cold was still kept to the head, and the mixture given occasionally when she was restless.

17th. More conscious; the skin moist; tongue cleaning, but sore from having been bitten during her convulsions; the tenderness over the abdomen gone; the pulse 96 and stronger.

18th. Perfectly conscious; skin moist; tongue clean; pulse 80; abdomen soft; the lochial discharge quite free. Applied an ointment of the extr. belladonna to the mammary glands to prevent the secretion of milk.

19th. The bowels were moved naturally this morning. No secretion

of milk, but the pupils are somewhat dilated by the belladonna. Has no recollection of her sickness; her reduced size assuring her that her babe was born, and not being aware of its death, she has often inquired for it. She remembers the afternoon of Saturday, the 14th ult., when a thunder-storm occurred whilst she was standing near the window; a heavy clap of thunder, followed by a vivid flash of lightning, caused her to move towards the centre of the room; of what occurred from that time until Tuesday 17th she knows nothing.

21st. Is weak and nervous; has no appetite; gave her some animal broth, and ordered a teaspoonful three times a day of the following: R.—Elix. ammon. valer. \mathfrak{z} ss, elix. cinchona \mathfrak{z} iss.—M.

23d. Appetite very good, and strength increasing. Partook freely of mutton-chops and coffee. The pulse now reduced to 72; skin cool; tongue clean; bowels moved naturally; the lochial discharge has nearly ceased; no pain in the head, and she is "in her right mind."

25th. The lochia have ceased; she is perfectly convalescent; is anxious to resume her household duties.

August 1st. She has now so far recovered as to require no further attendance.

The peculiarity of this case was, that after such free depletion she remained unconscious for 36 hours, and yet recovered so rapidly without any unfavourable symptoms.

Case of Poisoning by Morphia. By D. WEBSTER PRENTISS, M. D., of Washington, D. C.

I was called on Monday night, Oct. 8th, about 10 o'clock, to see, in consultation, a light mulatto, aged 16, of no settled occupation, but had last been engaged in "long boating," in which business he had contracted intermittent fever; apparently not of strong vital power. When first seen he was perfectly comatose, motionless; breathing scarcely perceptible, except at intervals of twice or thrice in a minute, when long stertorous inspirations were taken; eyes closed, and pupils contracted to the size of a pin's head, and entirely insensible to light; extremities cold, and general surface of the body cool, except in the neighbourhood of the heart; pulse about 80 per minute and very feeble; face livid and congested, but not *puffy*, and very strongly reminded me of the expression of countenance I saw in several fatal cases of sunstroke last summer.

The history of the case was, that he left home in the morning *well*; about half past eleven, "feeling a chill coming on" (his own expression), he took two pills from a friend, which it was said would cure them. Shortly after, had a spasm of some sort lasting five or ten minutes; about one o'clock felt sleepy, but expressed himself as being afraid to go to sleep, for fear of not waking again; nevertheless, laid down and fell asleep. Supposing him to be sleeping naturally, he was not disturbed by his friends until later in the afternoon, when, on attempting to waken him, it was found he could not be entirely roused. From this time the breathing was stertorous, and the coma continued increasing until half past nine, when the first physician was summoned. Then it was impossible even to partially arouse the patient, and the general condition was the same as described above, except the pulse, which was 60 beats per minute and rather full. It however rapidly grew feebler, and then increased in frequency; later the pulse was slow and hardly perceptible between the long inspirations, when it was sometimes difficult to say that the patient still lived.

but quickened, with tumultuous action of the heart, when the convulsive effort for breath came on, indicating that the vital power was rapidly being exhausted. Death took place about 12 o'clock midnight.

The treatment was simply warmth, sinapisms, and frictions; and hypodermic injections of one-eighth of a grain of *sul. atropia*, first over the deltoid muscle, and repeated in loose skin of the neck. These last were evidently not absorbed, for the little tumour caused by the fluid remained up to the time the case was given up, half an hour after the trial of the drug, and about the same time before death.

Autopsy thirty-nine hours after death.—Body packed in ice; cadaver thin but not emaciated. Cavity of abdomen opened; *peritoneum* perfectly healthy; stomach and bowels apparently the same, externally rather paler than usual; *stomach* tied at both extremities and reserved for chemical examination; *bowels* contained a very little solid matter, and *that* healthy looking feces. Liver, kidneys, and bladder inspected, but not removed, nothing abnormal in their appearance. Cavity of thorax not examined. The calvarium was next removed, and contents of skull observed. There was strongly marked venous congestion of the surface of the cerebrum; the blood was abnormally fluid; a fibrinous clot was found in the longitudinal sinus, commencing at its confluence with the lateral sinus, and extending down the right lateral sinus. In the left lateral sinus was a feeble clot of black blood. This clot of fibrin was very feeble, being with difficulty extracted, and when placed on paper, collapsed more than half its size, by losing the serum which it had entangled.

The substance of the brain was healthy, but also congested; when cut, little points of blood exuded from the cut surface. There was no fluid in the ventricles, nor cavity of the arachnoid. Base of brain was likewise congested.

It will not perhaps be improper to add in connection with the account of this case, that it was investigated by a coroner's jury, who failed to agree, because no provision is made by the law in this district for paying for chemical examinations in such cases, and no expert chemist could be found to take the responsibility without a proper fee. The circumstantial evidence was strong, that opium or some of its preparations had caused the death, but the physicians were unwilling to give a positive opinion without an analysis of the contents of the stomach, and also of a sample of the pills taken by the patient. This could not be obtained, and the coroner's jury were discharged without a verdict.

At whose door the responsibility of the boy's death may lie, does not concern us in this report, the medico-legal bearing of the case, as adding another to the list of opium poisoning, being only of interest. In order to confirm the case, I took pains to secure a sample of the pills taken, to analyze for my own satisfaction. The pill had lost all of its moisture by evaporation, and was crumbling again to powder, weight two grains. It was tested with nitric acid, the result being compared to that obtained by adding the same acid to undoubted sulphate of morphia; in both instances it was precisely the same—at first a deep orange red solution, with effervescence, then, on addition of an excess of acid, a yellow.

From the testimony before the coroner, it appeared that the man giving the boy the pills had taken one of them himself, at night, producing vomiting, followed by intense drowsiness; and on the following morning had taken another with the same effect, the vomiting probably saving his life.

Obstinate Singultus cured by Extract of Cannabis Indica.—Dr. GEO. P. SALMON, of New Lebanon, New York, has communicated to us a case of singultus which persisted for five days, resisting various antispasmodics, stimulants, &c., and which was entirely relieved in five hours by the administration of eight drops of Tilden's extract of Cannabis Indica every hour. Dr. S. states that he has used the same remedy beneficially to check the paroxysm of asthma, and has found it valuable in hysteria and in the nervous irritability resulting from various uterine disorders.

Four Children at a Birth. By C. J. FAUST, M. D. of Oaklands, S. C. On the 3d inst. I visited Mrs. H., who had been confined on the 26th of last month at 11 o'clock A. M. of a healthy male child, and on the morning of the 27th, between the hours of 6 and 8 o'clock A. M., she was delivered of three more healthy male children, making four in all.

They will average five pounds in weight, look well, and seem to be perfectly healthy, and all nurse the mother. There was but one placenta, very large, square, and the umbilical cords were attached to each corner. The mother is just 25 years of age, and had had nine living children prior to the birth of these, and is doing as well as she usually did in her previous confinements.

These are facts that can be asserted to by two respectable physicians (Drs. Folk and Black) who were in attendance.

March 6th, 1867.

DOMESTIC SUMMARY.

Abscess of the Appendix Vermiformis; Operation; Cure.—Under this title Prof. WILLARD PARKER relates (*Medical Record*, March 15, 1867) the following highly interesting case: "J. D., æt. 40, strong, of full habit, was attacked with pain in the bowels at half-past four o'clock in the morning of Friday, January 12, 1866. He has been more or less subject to severe attacks in the bowels for some years. The night preceding the present attack, he had been out with friends and had eaten a late supper. At five A. M. he vomited, and felt some pain in the right iliac fossa. At eight, he took coffee and toast, after which he went down town. During the day he had no appetite, and took no food until evening, when he ate a little cold chicken. There was no movement from the bowels during the day. In the night he had nausea. On the 13th he arose early, having passed a restless night. After breakfast he took two blue-pills. During the day he suffered from pain in the right side, which was relieved by bending over to that side. On the 14th, there being as yet no movement from the bowels, he took a glass of Saratoga Empire water. Pain, restlessness, and nausea still continued. Mustard was applied over the affected side. This evening he had an inefficient movement from the bowels. On the 15th, the above symptoms increased in severity, continued, and in addition he was troubled with eructations. In the evening his family physician, Dr. Sabine, saw him, and ordered opium, and a blister to the affected side, also leeches. On the 16th, I saw the patient in consultation with Dr. S. We found him with a thickly coated tongue; no appetite; nausea, and a constipated state of the bowels; pulse inflammatory, ranging over 100; skin dry and feverish; abdomen tumid and resonant on percussion; pain in the whole abdomen, but more decided in the right iliac fossa. Over this was a circumscribed tenderness, the boundaries of which could easily be marked out by the fingers. Micturition painful; pain also extended down the right thigh, and to the right testicle, which was drawn up. He was lying with his right thigh flexed on the pelvis, which position gave him some relief.

The case was diagnosed as probably abscess of the appendix vermiformis.

To render it certain, however, that there was no internal hernia, intussusception, or impaction of feces, and to clear up the diagnosis, we ordered calomel, gr. xv, and opium, gr. iij, to be given in three doses. On the morning of the 17th, ol. ricini \mathfrak{z} j, with tr. opii gtt. xx, were administered, and operated freely, a large quantity of scybalous feces coming away. The immediate effect was an amelioration of all the symptoms. The pulse became soft, and fell to 80; skin moist; tongue less coated; some return of appetite; abdomen less tumid, and the pain became definitely circumscribed in the right iliac fossa. On the 19th, his symptoms indicated a return of his former condition. During this day he was kept under the influence of opium, and on the 20th, finding his symptoms more unfavourable, his exact condition was explained to him and the operation proposed. It was, with his consent, decided that if on the next day there should be no improvement, it should be performed. On the 21st, there being no change for the better, but, if anything, for the worse, and it now being the ninth day of the attack, it was decided to operate as soon as practicable. An injection of catnip-tea was given, to relieve the bowels of wind, and at half-past two P. M., assisted by Drs. Sabine, Sands, Thomas Sabine, and my pupil, Mr. Wynkoop, I commenced the operation.

An incision six inches in length was made through the integument, commencing above, and about one inch from, the anterior superior spinous process of the ilium, running towards the symphysis pubis. About one inch of the incision was above an imaginary line drawn from one ant. sup. spin. proc. to the other, and five inches below. The incision was continued carefully down, and all the structures found to be healthy, until the fascia transversalis was reached, which was found to be thickened. This was divided over a director, and right beneath a tumour was felt, which was about two inches long and an inch and a half in width. An exploring needle was introduced, when immediately there gushed up some thick, bad-smelling pus. The sac was now freely opened, and about four ounces of pus, in which there may have been a little feces discharged. A tent was introduced into the cavity, and the wound left to close up by the granulations. The patient rallied well after the operation, and passed a good night. The next morning he was in a quiet condition; pulse 84, soft; tongue more moist; abdomen soft; but little fever; wind escaping freely from the bowels; wound discharging healthily. The after-treatment consisted entirely of rest, opium, and nourishment. Perfect recovery took place in three weeks, and at the date of writing (Dec. 1866) he is enjoying perfect health.

Poisoning by Morphia relieved by Belladonna.—Dr. J. L. PRENTISS records (*Chicago Med. Journ.*, Dec. 1866) a case of a female said to have swallowed five grains of morphia at 5 o'clock P. M. Aug. 28. When seen by Dr. P. at 11 o'clock P. M. she was in a state of complete insensibility; pulse 80, moderately full; pupils contracted; breathing stertorous; and at times arrested for a minute; skin cold; masseter muscles rigid; and teeth firmly closed. By the application of cold to the head and cold douche to the face and chest and considerable shaking she was sufficiently roused to be able to swallow; when one drachm of tincture of belladonna was given and the dose repeated every half hour for two hours when the pupils became dilated, the breathing more natural, and the patient seemed comparatively free from the influence of the morphia.

Grindelia Robusta in Asthma.—Dr. HENRY GIBBONS, editor of the *Pacific Med. and Surg. Journ.*, relates in the number of that Journal for December last, the case of a clergyman, of San Francisco, "who had been a victim of asthma, in its most virulent form, for about six years. His health gradually yielded to the disease, until at length he felt almost prepared to succumb, and to abandon all prospects of further service in his vocation. For a long time he had generally passed the night in his chair, with the torture usually incident to his disorder. He had exhausted the ordinary round of remedies, finding some relief from the paroxysm in the inhalation of chloroform. At this juncture a friend sent to him a quantity of syrup prepared from the herb above named, with the assurance that the person sending it, and a number of other individuals, had been cured or greatly benefited by the use of it in asthma.

Without attaching any importance to the article, or anticipating any benefit from it, he took a wineglassful of the syrup on going to bed—not, however, until he had consulted his physician, Professor Ayres, who permitted its use merely as a safe experiment. That night, for the first time for many months, he slept soundly, and was amazed, on waking, to find that the night was past. This was in April last, and he continued the medicine regularly in the same manner, with the same results, for four months, when a slight return of the disease took place, after unusual exposure and fatigue. But he has not spent one night out of bed since beginning the use of the medicine, now seven months ago. His general health and strength are greatly improved, and he is now capable of performing the most arduous duties incident to his profession, though frequently threatened with returns of his malady. On the threatened approach of a paroxysm, indicated by a sense of constriction and wheezing, he immediately resorts to the medicine, always with relief. Besides this, he takes regularly about a wineglassful of the syrup every night. Hitherto, he has suffered most severely late in autumn, prior to the rainy season. But this year he has passed through that period with comparative comfort.

"The syrup is prepared from a strong decoction of the herb, in the usual manner, a small quantity of gin or brandy being added to prevent fermentation. It is not unpleasant to the taste. It has no apparent effect on the stomach, bowels, kidneys, or skin. The only sensible effect is on the pulmonary organs, promoting expectoration.

"The *Grindelia Robusta* grows extensively through the State, mostly in hilly situations. It throws up a straight unbranched stem, one or two feet in height, with short, rather rigid leaves, and a spherical head of flowers on the top. It belongs to the composite order of plants, the flowers having white rays about half an inch long. It may easily be known by a drop or two of a resinous fluid, which looks precisely like milk, and which is always to be seen attached to the calyx. In the mouth it yields a balsamic taste, and the odor is aromatic or balsamic."

A New Canulated Needle for Introducing the Wire in Operations for Vaginal Fistulae. Dr. GEO. SVNG BRYANT describes (*St. Louis Medical and Surgical Journal*, vol. iii, No. 6) a modification which he has made of Mr. Startin's canulated needle for introducing the wire in vaginal fistules. He has altered somewhat the shape of Mr. Startin's needle, and added to it a slide with a key and spring attached, so as to hold fast the wire, and furnish just the amount wanted at each stitch.

The accompanying cut is of two-thirds size, and requires no explanation, for with even a superficial examination, every part of the instrument will be readily comprehended by the surgeon. Dr. B. states that he is now having made a needle, curved laterally, for the transverse suture, in longitudinal or oblique fistules, and also has just completed a diagram for a needle upon this plan, to be used in operations for cleft palate.

Menstruation in the Male.—Dr. V. O. KING records (*Southwestern Journ. Med. Science*, Feb. 1867) a case of this in a young man, about 22 years of age. The discharge flowed from the sebaceous glands of the deep fossa behind the corona glandis, was of a sanguineous appearance, homogeneous and thick; the quantity varied from one to two ounces at each period, and the period lasted from three to six days. When Dr. K. made the acquaintance of the subject of this anomaly, the vicarious secretion had been observed for three years.



Fracture of Cricoid and Thyroid Cartilages.—Dr. F. H. HAMILTON presented to the New York Pathological Society (June 13th, 1866) a specimen sent him by Dr. Ellis, of Kent Co., Michigan. He then gave the following history:—

It is a fracture of the cricoid and thyroid cartilages. The accident occurred on the 13th of September, 1864, the patient being kicked in the throat by another man who happened to be on a platform above him. The blow was inflicted on the front of the larynx a little to the right side. After the receipt of the injury the man staggered and was able to walk to his house, which was some distance from the place. The physician was immediately called, and found his patient with symptoms of threatened suffocation. No surgical means were employed for his relief, and he died in two and a half hours. The autopsy was made by Dr. Ellis, but he did not examine the interior of the laryngeal box. He observes that there was a fracture of the thyroid cartilage nearly in the median line, in front, and a little to the right; that the cricoid cartilage was broken vertically, or nearly so, deflecting obliquely nearly an inch from the median line.

I think that there is a line of fissure on the left side corresponding to this point. The thyroid cartilage is depressed about two lines on the right side. The point of interest on laying it open is, that I find that there has been an extensive infiltration of blood underneath the mucous membrane lining the larynx, and extending a little down in the trachea. This effusion is particularly abundant on the right side, just below the ventricle. The Dr. informs me that at the autopsy (two years ago) this bloody effusion filled up the larynx.

I believe that this man died of apoplexy of the larynx. I think that whatever effusion might have occurred in the course of two hours and a half, would have been comparatively insignificant. It is very apparent now, that an operation might have saved the patient's life, yet it is a little remarkable, although this operation is the natural suggestion in the great majority of instances, it has not been performed. In the majority of instances the patients have been permitted to die without interference, in all probability the diagnosis not being fully made out, or it not being supposed that the fracture of itself should cause death.

In connection with this case, I may say that I reported one of fracture of the cricoid and thyroid cartilages on which I operated. The patient survived seventy-two hours after the injury, and thirty-six hours after the operation. I do not know what he died of, as he was very far from my residence. His symptoms of suffocation, however, were entirely relieved. In these cases there is very strong reason why the operation should be performed early. The injury is a very severe one, and the swelling which will soon interpose will be a very serious obstacle.

In answer to a question from Dr. Post, he remarked that the physician thought his case was terminated by inflammation of the lungs.

Dr. KRACKOWIZER did not think that pneumonia could kill a man in thirty-six hours, but was disposed to refer the cause of death to the œdematous effusions and congestion of the organs, brought about by the disturbance in the lungs occasioned by a struggle of thirty-six hours for breath.—*Medical Record*, Jan. 1, 1867.

Removal of the Uterus and its Appendages in a Case of Prolapsus Uteri.—Dr. S. CHOPPIN relates (*Southern Journ. Med. Sciences*, Feb. 1867) a case of this. The subject of it was a woman 38 years of age. The tumour was six inches in length and three and a half in breadth. The operation for narrowing the vagina having failed to afford relief, Dr. C. determined to remove the uterus and its appendages. Accordingly, on the 12th January, 1861, the patient being brought under the influence of chloroform, Dr. C. operated in the following manner:—

“The tumour was seized by a pair of vulsellum forceps, implanted in the neck of the uterus, dragged down as far as possible, and held steadily by an assistant. A circular incision was then made through that portion of the vagina attached to the neck of the uterus, so as to completely separate it, with a view of drawing the organ down and separating it from its peritoneal attach-

ment; but I was thwarted in my attempt, by adhesions which were found to exist anteriorly between the anterior wall of the vagina and uterus to the posterior wall of the bladder, and posteriorly to the lower wall of the vagina and anterior walls of the rectum. By a careful dissection I severed the anterior and posterior adhesions, thus permitting of further traction downward of the uterus, and exposing a pedicle made up of the peritoneal attachments of the organ. The hemorrhage, which thus far had been quite profuse, was arrested before proceeding any further. The loop of 'Chassaignac's Ecraseur' was now thrown around the peritoneal attachments and gradually tightened, during a period of twenty-five minutes, when its division was completed, and the uterus, left Fallopian tube and left ovary removed. It was found that the right ovary had not descended, and, consequently, the right Fallopian tube was comprised in the pedicle of the tumour, and severed near the body of the uterus, as is seen in the wood-cut. Not considering their removal necessary to the success of the operation, they were allowed to remain in the abdomen. No blood followed the use of the ecraseur. At this stage of the operation, hernia of a loop of intestine took place. This was reduced, and further descent prevented by pressure of the hand of the assistant over the vulva, until permanent closure of the opening in the vagina could be effected. This was done by means of Sims' clamp suture. The inverted vagina was then reduced, the patient removed to her bed, placed upon her back with the pelvis elevated, and a full dose of opium administered. The patient rested well all that night. The next day no febrile reaction whatever occurred, although she complained of some tenderness or soreness over the abdomen. On the third day suppuration began, but, an examination by the speculum showed that most of the vaginal wound had healed by first intention. The suppuration, however, continued, quite profuse at times, for about three weeks, when the wire sutures and clamps came away. She was again examined with the speculum, and complete cicatrization of the wound was found to have taken place. The general health of the patient began rapidly to improve from that moment. On the 19th day of February she was presented, in my clinical lecture, to the class of the 'New Orleans School of Medicine,' with her womb in her hand, thus demonstrating that the uterus could be removed without causing death. The patient remained under observation until the following April, during which time her condition improved, so that she presented, at the time of leaving our infirmary, a robust and healthy appearance. Returning to labour and usefulness, she continued to enjoy good health, as I have been informed, until the spring of 1864, when she succumbed to an attack of dysentery."

Iron Ring for Treatment of Fractured Patella.—Prof. PAUL F. EVE, of Nashville, extols (*Nashville Journ. Med. and Surg.*, Feb. 1867) the use of the iron ring in the treatment of fractured patella, as proposed by Dr. W. A. Gibson, of St. Louis (see No. of this Journal for Jan. 1867, p. 281), and records two cases in which he successfully resorted to that plan of treatment.

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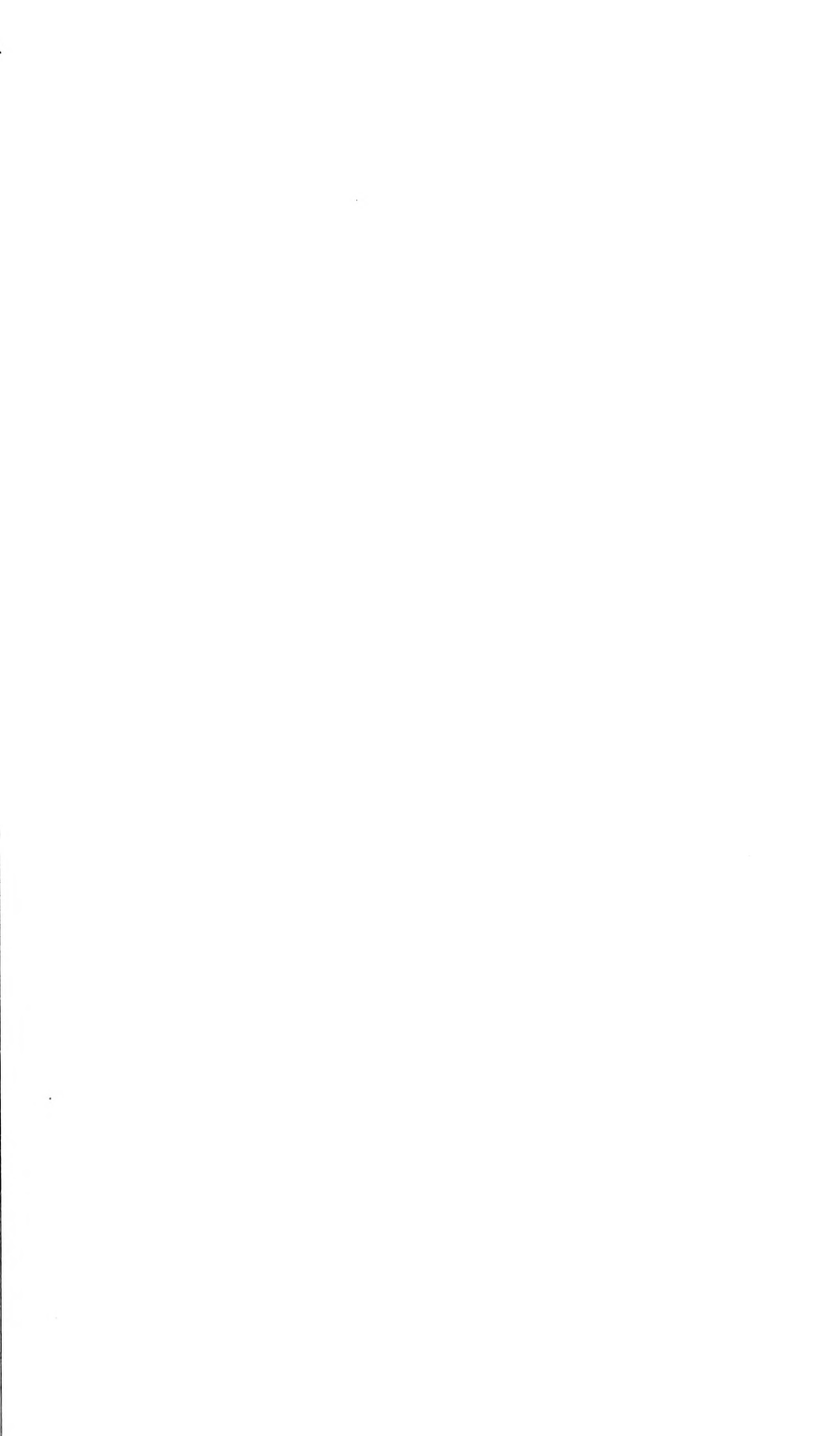
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